

## SEARCH REQUEST FORM

CAN 11/30/02

Examiner # (Mandatory): Cam Nguyen Requester's Full Name: 58998Art Unit 1754 Location (Bldg/Room#): CP3-9B06 Phone (circle 305) 306 308) 3923Serial Number: 091653,719 Results Format Preferred (circle): PAPER DISK E-MAILTitle of Invention Fischer-Tropsch catalyst enhancementInventors (please provide full names): Alla Jurierna, Knzlova et al.Earliest Priority Date: 9/1/00

Keywords (include any known synonyms, registry numbers, explanation of initialisms):

\* please search for claims 1-17 only!

see copy of claims attached.

## Search Topic:

Please write detailed statement of the search topic, and the concept of the invention. Describe as specifically as possible the subject matter to be searched. Define any terms that may have a special meaning. Give examples of relevant citations, authors, etc., if known. You may include a copy of the abstract and the broadcast or most relevant claim(s).

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Date Completed: 1/29/02Clerical Prep Time: 20Terminal Time: 53

Number of Databases: \_\_\_\_\_

## Type of Search

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\_\_\_\_ A.A. Sequence

\_\_\_\_ Structure (#)

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\_\_\_\_ Litigation1

\_\_\_\_ Fulltext

\_\_\_\_ Procurement

\_\_\_\_ Other

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=> d que 117

L7	6691	SEA FILE=HCAPLUS ABB=ON	DAM OR DISPERS?(4A)ACTIV?(2A)METAL?
L9	287	SEA FILE=HCAPLUS ABB=ON	L7 AND (CAT/RL OR CATALYST?)
L10	150	SEA FILE=HCAPLUS ABB=ON	L9 AND (RE OR RHENIUM OR RU OR RUTHEN? OR PD OR PALLAD? OR FE OR IRON OR FERRIC OR FERROUS OR CO OR COBALT)
L11	42	SEA FILE=HCAPLUS ABB=ON	L10 AND (HYDROGEN OR H2)
L12	19	SEA FILE=HCAPLUS ABB=ON	L11 AND HYDROGENAT?
L13	14	SEA FILE=HCAPLUS ABB=ON	L11 AND (PREP OR IMF OR SPN)/RL
L14	1	SEA FILE=HCAPLUS ABB=ON	L11 AND FISCHER?
L15	29	SEA FILE=HCAPLUS ABB=ON	L11 AND CATALYST?/TI
L16	27	SEA FILE=HCAPLUS ABB=ON	L11 AND INORGANIC/SC,SX
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=> d que 125

L19 8537 SEA FILE=WPIX ABB=ON DAM OR DISPERS?(4A)ACTIV?(2A)METAL?  
L20 436 SEA FILE=WPIX ABB=ON L19 AND (RE OR RHENIUM OR RU OR RUTHEN?  
OR PD OR PALLAD? OR FE OR IRON OR FERRIC OR FERROUS OR CO OR  
COBALT)  
L21 40 SEA FILE=WPIX ABB=ON L20 AND CATALYST?  
L22 13 SEA FILE=WPIX ABB=ON L21 AND (H2 OR HYDROGEN)  
L24 5 SEA FILE=WPIX ABB=ON L22 AND (HYDROGENAT? OR FISCHER?)  
L25 13 SEA FILE=WPIX ABB=ON L22 OR L24

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PROCESSING COMPLETED FOR L25  
L26 52 DUP REM L17 L25 (0 DUPLICATES REMOVED)

=> d all 126 (1-52)

L26 ANSWER 1 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 2001:868305 HCAPLUS  
DN 136:8990  
TI Olivine-supported nickel **catalyst** for fluidized-bed gasification  
of biomass for manufacture of fuel gases and synthesis gas  
IN Courson, Claire; Petit, Corinne; Kiennemann, Alain; Foscolo, Pier Ugo;  
Rapagna, Sergio; Matera, Domenico Antonio  
PA Universite Louis Pasteur, Fr.; ENEA - Ente per le Nuevo Tecnologie,  
l'Energia e l'Ambiente; Universita degli Studi di l'Aquila  
SO PCT Int. Appl., 18 pp.  
CODEN: PIXXD2  
DT Patent  
LA French  
IC ICM B01J023-755  
ICS C10J003-54; C01B003-38  
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 51  
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI WO 2001089687 A1 20011129 WO 2001-FR1547 20010518  
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT,  
RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US,  
UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,  
DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,  
BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG  
FR 2809030 A1 20011123 FR 2000-6526 20000522  
PRAI FR 2000-6526 A 20000522  
AB **Catalyst** for fluidized-bed gasification of biomass,  
characterized in that it contains, a **active metal**  
(typically Ni) phase **dispersed** on an olivine support of general  
formula  $(MgxFe_{1-x})_2SiO_4$  ( $x = 0-1$ ), esp.  $x = 0.92$ , with stoichiometric  
excess **Fe** (as oxide). The **catalyst** is prep. by: (1)  
washing the olivine support, with drying and a first calcination, (2)  
grinding and sieving the support, (3) depositing NiO on the support by  
impregnation (from one or more Ni salts, such as  $Ni(NO_3)_2 \cdot 6H_2O$ ), (4) a  
second calcination step, at 900-1300.degree. (preferably  
.apprx.1100.degree.), (5) sieving the **catalyst**, and (6) reducing  
the nickel **catalyst** (at 750-900.degree., preferably  
.apprx.865.degree.) in **hydrogen** to deposit metallic Ni. The  
**catalyst** can be used for fluidized-bed carbonization/gasification  
of biomass, esp. for **hydrogen** manuf. and synthesis gas reactions  
by methane reforming (with CO<sub>2</sub> or water) and steam reforming of tar  
byproduct.  
ST fluidized bed gasification biomass nickel catalysis; synthesis gas biomass  
fluidized bed gasification; fuel gas biomass fluidized bed gasification;  
olivine support nickel gasification biomass  
IT Tar  
RL: PNU (Preparation, unclassified); RCT (Reactant); **PREP**  
(**Preparation**); RACT (Reactant or reagent)  
(biomass, in-situ formation and reforming of; olivine-supported nickel  
**catalyst** for fluidized-bed gasification of biomass for manuf.  
of fuel gases and synthesis gas)  
IT Fuel gas manufacturing  
(gasification, fluidized-bed, of biomass; olivine-supported nickel  
**catalyst** for fluidized-bed gasification of biomass for manuf.  
of fuel gases and synthesis gas)  
IT Synthesis gas manufacturing  
(gasification-steam reforming; olivine-supported nickel  
**catalyst** for fluidized-bed gasification of biomass for manuf.  
of fuel gases and synthesis gas)  
IT Reforming  
Steam reforming  
(in-situ, of biomass tars; olivine-supported nickel **catalyst**  
for fluidized-bed gasification of biomass for manuf. of fuel gases and  
synthesis gas)  
IT Reforming **catalysts**  
Steam reforming **catalysts**  
(nickel, for biomass tars; olivine-supported nickel **catalyst**  
for fluidized-bed gasification of biomass for manuf. of fuel gases and  
synthesis gas)  
IT Biomass  
Fluidized beds  
Thermal decomposition  
(olivine-supported nickel **catalyst** for fluidized-bed  
gasification of biomass for manuf. of fuel gases and synthesis gas)

- IT Olivine-group minerals  
RL: CAT (Catalyst use); USES (Uses)  
(support; olivine-supported nickel **catalyst** for fluidized-bed gasification of biomass for manuf. of fuel gases and synthesis gas)
- IT Biomass  
RL: PNU (Preparation, unclassified); RCT (Reactant); **PREP (Preparation)**; RACT (Reactant or reagent)  
(tar, in-situ formation and reforming of; olivine-supported nickel **catalyst** for fluidized-bed gasification of biomass for manuf. of fuel gases and synthesis gas)
- IT 1313-99-1, Nickel oxide (NiO), uses  
RL: CAT (Catalyst use); USES (Uses)  
(**catalyst**; olivine-supported nickel **catalyst** for fluidized-bed gasification of biomass for manuf. of fuel gases and synthesis gas)
- IT 74-82-8P, Methane, preparation  
RL: PNU (Preparation, unclassified); RCT (Reactant); **PREP (Preparation)**; RACT (Reactant or reagent)  
(in-situ formation and reforming of; olivine-supported nickel **catalyst** for fluidized-bed gasification of biomass for manuf. of fuel gases and synthesis gas)
- IT 1333-74-0P, Hydrogen, preparation  
RL: IMF (Industrial manufacture); **PREP (Preparation)**  
(manuf. of; olivine-supported nickel **catalyst** for fluidized-bed gasification of biomass for manuf. of fuel gases and synthesis gas)
- IT 13478-00-7, Nickel nitrate, hexahydrate  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(nickel source; olivine-supported nickel **catalyst** for fluidized-bed gasification of biomass for manuf. of fuel gases and synthesis gas)
- IT 109166-61-2, Iron magnesium silicate ((Fe,Mg)<sub>2</sub>(SiO<sub>4</sub>))  
RL: CAT (Catalyst use); USES (Uses)  
(olivine, support; olivine-supported nickel **catalyst** for fluidized-bed gasification of biomass for manuf. of fuel gases and synthesis gas)

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Basf Ag; FR 2121148 A 1972 HCAPLUS

L26 ANSWER 2 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 2001:936972 HCAPLUS

TI Hydrodechlorination of 1,1-dichlorotetrafluoroethane on supported **palladium catalysts**. A static-circulation reactor study

AU Karpinski, Zbigniew; D'Itri, Julie L.

CS Department of Catalysis on Metals, Institute of Physical Chemistry, Polish Academy of Sciences, Warsaw, PL-01224, Pol.

SO Catalysis Letters (2001), 77(1-3), 135-140

CODEN: CALEER; ISSN: 1011-372X

PB Kluwer Academic/Plenum Publishers

DT Journal

LA English

CC 45 (Industrial Organic Chemicals, Leather, Fats, and Waxes)

AB Supported **palladium catalysts** were studied in CF<sub>3</sub>CFCl<sub>2</sub> hydrodechlorination at 100.degree.C using a static-circulation system. In order to minimize **catalyst's** deactivation a large excess of **hydrogen** was employed (H<sub>2</sub>/CF<sub>3</sub>CFCl<sub>2</sub> ratio 54/1). In spite of this precaution significant inhibition of the process occurred, assocd. with blocking **palladium** surface by **hydrogen** chloride species. Differences in the catalytic behavior of

alumina-supported and unsupported **palladium** are discussed. A mild dependence between the catalytic activity and **Pd** dispersion was found. The **Pd/Al<sub>2</sub>O<sub>3</sub> catalyst** characterized by low **metal dispersion** was more active than highly dispersed **catalysts**, showing the overall activity and selectivity to CF<sub>3</sub>CFH<sub>2</sub> comparable with those obsd. by other authors for **palladium** single crystals. It is speculated that the most active sites for hydrodechlorination are plane atoms, whereas low coordination sites (on edges and corners of metal crystallites) are less suitable.

RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (2) Campbell, J; Trans Faraday Soc 1963, V59, P2583 HCAPLUS
- (3) Coq, B; J Catal 1986, V101, P434 HCAPLUS
- (4) Coq, B; J Catal 1993, V141, P21 HCAPLUS
- (5) Coq, B; J Phys Chem 1995, V99, P11159 HCAPLUS
- (6) Early, K; J Catal 1999, V182, P219 HCAPLUS
- (7) Gervasutti, C; J Fluorine Chem 1981, V19, P1 HCAPLUS
- (8) Ichikawa, S; J Catal 1985, V91, P1 HCAPLUS
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- (13) Rupprechter, G; Catal Lett 1997, V48, P17 HCAPLUS
- (14) Tanaka, M; J Catal 1970, V16, P157 HCAPLUS
- (15) Thomson, J; J Mol Catal 1991, V67, P117 HCAPLUS
- (16) Thomson, J; J Mol Catal 1991, V68, P347 HCAPLUS
- (17) van Hardeveld, R; Surf Sci 1969, V15, P189 HCAPLUS
- (18) van de Sandt, E; Appl Catal A 1997, V155, P59 HCAPLUS
- (19) van de Sandt, E; Catal Today 1997, V35, P163 HCAPLUS
- (20) van de Sandt, E; Recl Trav Chim Pays-Bas 1996, V115, P505 HCAPLUS
- (21) Wiersma, A; Catal Today 1996, V27, P257 HCAPLUS

L26 ANSWER 3 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 2001:499154 HCAPLUS

DN 135:359907

TI Hydroisomerization of n-butane over hybrid **catalysts**

AU Canizares, P.; Dorado, F.; Sanchez-Herrera, P.

CS Faculty of Chemistry, Department of Chemical Engineering, University of Castilla-La Mancha, Ciudad Real, 13004, Spain

SO Appl. Catal., A (2001), 217(1-2), 69-78

CODEN: ACAGE4; ISSN: 0926-860X

PB Elsevier Science B.V.

DT Journal

LA English

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)

AB The influence of redn. temp., metal incorporation technique, and metal loading on the hydroisomerization of n-butane over hybrid **catalysts** prepd. by phys. mixing H-mordenite (HMOR) and **Pd**/montmorillonite (Mont) was studied. Temp.-programmed desorption of ammonia (TPDA), Fourier transform IR (FTIR), at. absorption spectroscopy (AA), BET surface area/pore size distributions, and chemisorption measurements were used to characterize the **catalysts**. The method used to load the metal was found to be an important factor that affected the final **catalyst** acid properties, **metal dispersion** and, hence, its **activity** and selectivity. Thus, the highest selectivity to isobutane was achieved over an ion-exchanged **catalyst**. Compared to classic metal-supported HMOR **catalysts**, hybrid **catalysts** showed a higher selectivity to isobutane.

ST butane hydroisomerization **catalyst**  
IT **Hydrogen** mordenite-type zeolites  
RL: CAT (Catalyst use); USES (Uses)  
(contg. Pd and montmorillonite; hydroisomerization of  
n-butane over hybrid **catalysts**)  
IT Petroleum hydrotreating **catalysts**  
(hydroisomerization; hydroisomerization of n-butane over hybrid  
**catalysts**)  
IT 1318-93-0, Montmorillonite, uses  
RL: CAT (Catalyst use); USES (Uses)  
(contg. Pd and H-mordenite; hydroisomerization of n-butane  
over hybrid **catalysts**)  
IT 7440-05-3, Palladium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(contg. montmorillonite and H-mordenite; hydroisomerization of n-butane  
over hybrid **catalysts**)  
IT 106-97-8, Butane, reactions  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC  
(Process)  
(hydroisomerization of n-butane over hybrid **catalysts**)

RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Asuquo, R; J Catal 1995, V155, P376 HCAPLUS
- (2) Beyer, H; Zeolites 1998, V8, P79
- (3) Canizares, P; Appl Catal A: Gen 1998, V169, P137 HCAPLUS
- (4) Canizares, P; Appl Catal A: Gen 2000, V196, P225 HCAPLUS
- (5) Canizares, P; Appl Catal A: Gen 2000, V190, P233 HCAPLUS
- (6) Canizares, P; Ind Eng Chem Res 1997, V36, P4797 HCAPLUS
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- (8) Choudhary, V; Appl Catal A: Gen 1997, V162, P223 HCAPLUS
- (9) Coughlan, B; Zeolites 1991, V11, P2
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- (14) Law, P; J Catal 1980, V64, P241 HCAPLUS
- (15) Liu, H; Appl Catal A: Gen 1996, V137, P167 HCAPLUS
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- (23) Shigeishi, R; J Catal 1991, V130, P423 HCAPLUS
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L26 ANSWER 4 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 2001:539072 HCAPLUS

DN 135:244717

TI Environmental **catalysts** containing Ni and Mo supported on  
zeolite

AU Peng, Ming-sheng; Li, Di-en

CS Inst. Gemstones Mineral Materials, Zhongshan Univ., Canton, 510275, Peop.  
Rep. China

SO Anquan Yu Huanjing Xuebao (2001), 1(2), 42-44

CODEN: AYHXA2; ISSN: 1009-6094

PB Anquan Yu Huanjing Xuebao Zazhishe

DT Journal  
LA Chinese  
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)  
AB Catalytic **hydrogenation** and hydrocracking (HC) are refining processes for petroleum and coal liqs. The most popular **catalysts** used in industry are Co-/Ni-promoted Mo/W sulfides supported on .gamma.-Al<sub>2</sub>O<sub>3</sub>. New **catalysts** are in great demand since the contents of pollutants such as S, N, and heavy metals contained in oil must be reduced to one tenth of the present level. For such a purpose, the effects of B on the structure and activity of Ni-Mo/.gamma.-Al<sub>2</sub>O<sub>3</sub> **catalysts** are studied in the present paper. .gamma.-Al<sub>2</sub>O<sub>3</sub>-B<sub>2</sub>O<sub>3</sub> supports and Ni-Mo/.gamma.-Al<sub>2</sub>O<sub>3</sub>-B<sub>2</sub>O<sub>3</sub> **catalysts** in which the contents of NiO and MoO<sub>3</sub> are 3 and 12%, resp., are prepd. by impregnation method. Di-Ph and cyclohexylbenzene are formed in the hydrodesulfurization (HDS) of dibenzothiophene (DBT). X-ray diffraction and X-ray photo-electron spectrum are used to analyze the surface acidity and dispersion of metals. It is shown that the addn. of B modifies the acidity and the **active metal dispersion** of the **catalysts** and thus enhances the catalytic hydroprocessing activities of these model compds. over the Ni-Mo/.gamma.-Al<sub>2</sub>O<sub>3</sub> **catalysts**. Activity was at max. for 1% B<sub>2</sub>O<sub>3</sub> content. Ultrastable Y-type (USY) zeolite supported Ni-Mo **catalysts** are also studied. NH<sub>4</sub>Y zeolite is prepd. from NaY zeolite by ion exchange with (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>. USY zeolite is obtained after the calcination of NH<sub>4</sub>Y zeolite, dealumination, and removing Al by H<sub>2</sub>SO<sub>4</sub>. **Catalysts** supported on USY zeolite are prepd. by ion exchange method. These **catalysts** are treated with H<sub>2</sub>S-H<sub>2</sub> at 400 .degree.C and used in HDS of DBT and HC of Decalin, diphenylmethane, and Tetralin. USY zeolite-supported Ni-Mo **catalyst** has significantly higher activity.

ST hydrodesulfurization hydrocracking **catalyst**  
IT Hydrocracking **catalysts**  
Hydrodesulfurization **catalysts**  
(Ni-Mo-zeolite)  
IT Petroleum hydrotreating **catalysts**  
(hydrodesulfurization and hydrocracking of model compds. on Ni-Mo-zeolite)  
IT Ultrastable Y zeolites  
RL: CAT (**Catalyst use**); USES (Uses)  
(hydrodesulfurization and hydrocracking of model compds. on Ni-Mo-zeolite **catalyst**)  
IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses  
RL: CAT (**Catalyst use**); USES (Uses)  
(hydrodesulfurization and hydrocracking of model compds. on Ni-Mo-zeolite **catalyst**)  
IT 91-17-8, Decalin 101-81-5, Diphenylmethane 119-64-2, Tetralin  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(hydrodesulfurization and hydrocracking of model compds. on Ni-Mo-zeolite **catalyst**)  
IT 132-65-0, Dibenzothiophene  
RL: REM (Removal or disposal); PROC (Process)  
(hydrodesulfurization and hydrocracking of model compds. on Ni-Mo-zeolite **catalyst**)

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L26 ANSWER (5 OF 52) WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD  
AN 2000-246502 [21] WPIX  
CR 2000-246501 [19]; 2000-246503 [19]; 2001-353964 [36]  
DNC C2000-074580  
TI Production of hydrocarbons in Fischer-Tropsch process uses catalyst comprising iron, cobalt, nickel and or ruthenium dispersed in stabilized aquasol of colloidal oxide



of cerium, zirconium, titanium, aluminum and or silicon.

DC E17 H04

IN KOURTAKIS, K; MANZER, L E

PA (CONO) CONOCO INC

CYC 86

PI WO 2000010704 A1 20000302 (200021)\* EN 23p B01J021-08

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL

OA PT SD SE SL SZ UG ZW

W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB

GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU

LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR

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AU 9955721 A 20000314 (200031) B01J021-08

EP 1128905 A1 20010905 (200151) EN B01J021-08

R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

ADT WO 2000010704 A1 WO 1999-US18895 19990819; AU 9955721 A AU 1999-55721

19990819; EP 1128905 A1 EP 1999-942315 19990819, WO 1999-US18895 19990819

FDT AU 9955721 A Based on WO 200010704; EP 1128905 A1 Based on WO 200010704

PRAI US 1999-377008 19990818; US 1998-97192P 19980820; US 1998-97193P

19980820; US 1998-97194P 19980820; US 1999-376873 19990818; US

1999-377007 19990818

IC ICM B01J021-08

ICS C07C027-00

AB WO 200010704 A UPAB: 20010910

NOVELTY - A catalyst comprising iron, cobalt

, nickel and or ruthenium as catalytically active

metal dispersed in stabilized aquasol of colloidal oxide

of cerium, zirconium, titanium, aluminum and/or silicon provides high

selectivity to 5+C hydrocarbons and enhances process economics.

DETAILED DESCRIPTION - Production of hydrocarbons involves contacting a feedstream of hydrogen and carbon monoxide with

catalyst in a reaction zone at conversion conditions. The

catalyst comprises iron, cobalt, nickel and or

ruthenium dispersed in matrix material comprising a derivative of

a stabilized aquasol of colloidal oxide of cerium, zirconium, titanium, aluminum and/or silicon.

INDEPENDENT CLAIMS are included for:

(a) a Fischer-Tropsch catalyst as above; and

(b) preparing the catalyst by mixing a colloidal Sol of an oxide of cerium, zirconium, titanium, aluminum and/or silicon with soluble salt of iron, cerium, nickel and/or ruthenium, destabilizing the colloid to form a gel and removing solvent from the gel.

USE - For use in Fischer-Tropsch processes.

Dwg.0/0

FS CPI

FA AB; DCN

MC CPI: E10-J02D; E31-P05A; E35-K; E35-L; E35-U; E35-V; E35-W; E35-X; H04-E05; H04-F02E; N01-C; N01-D02; N02-A; N02-B; N02-C; N02-E01; N03-A; N03-B

L26 ANSWER 6 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 2000:318441 HCAPLUS

DN 133:17152

TI Study on the reaction kinetics of catalytic hydrogenation of diacetyl monoxime

AU Lu, Yue-qing; Lu, Wei-ming; Wang, Xiang-yu; Zheng, Xiao-ming

CS Institute of Catalysis, Zhejiang University (XiXi Campus), Hangzhou, 310028, Peop. Rep. China

SO Fenzi Cuihua (2000), 14(2), 147-150

CODEN: FECUEN; ISSN: 1001-3555

- PB Kexue Chubanshe  
DT Journal  
LA Chinese  
CC 22-7 (Physical Organic Chemistry)  
Section cross-reference(s): 67
- AB The kinetics of diacetyl monoxime (**DAM**) **hydrogenation** /cyclocondensation to tetramethylpyrazine catalyzed by Pd/PPh3 has been studied. The reaction follows second order kinetics with respect to **DAM** in the range of investigation, the zeroth order kinetics with respect to H2 pressure in optimum reaction conditions, and the first order kinetics with respect to **catalyst** concn. The kinetic equation of **hydrogenation** reaction rate obtained is  $r = k[\text{DAM}]^2[\text{Cat.}]$ . The activation energy for this reaction is  $E_a = 50.41 \text{ kJ} \cdot \text{mol}^{-1}$ . The inferred mechanism of reaction is in agreement with exptl. results.
- ST diacetyl oxime **hydrogenation** cyclocondensation **palladium** phosphine **catalyst** kinetics mechanism
- IT Cyclocondensation reaction  
Cyclocondensation reaction **catalysts**  
Cyclocondensation reaction kinetics  
**Hydrogenation**  
**Hydrogenation catalysts**  
**Hydrogenation** kinetics  
(kinetics and mechanism of Pd/PPh3-catalyzed **hydrogenation**/cyclondensation of diacetyl monoxime)
- IT 603-35-0D, Triphenylphosphine, **palladium** complexes 7440-05-3D, **Palladium**, triphenylphosphine complexes  
RL: CAT (**Catalyst** use); USES (Uses)  
(kinetics and mechanism of Pd/PPh3-catalyzed **hydrogenation**/cyclondensation of diacetyl monoxime)
- IT 57-71-6, Diacetyl monoxime  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); RCT (Reactant); PROC (Process)  
(kinetics and mechanism of Pd/PPh3-catalyzed **hydrogenation**/cyclondensation of diacetyl monoxime)
- IT 1124-11-4P, Tetramethylpyrazine  
RL: SPN (**Synthetic preparation**); PREP (**Preparation**)  
(kinetics and mechanism of Pd/PPh3-catalyzed **hydrogenation**/cyclondensation of diacetyl monoxime)
- 
- L26 ANSWER 7 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 2001:60701 HCAPLUS  
DN 134:208270  
TI Synthesis, characterization and physicochemical properties of polyphenols prepared by **cobalt**(II) catalysed oxidative polymerization  
AU Puzari, A.; Baruah, Jubaraj B.  
CS Department of Chemistry, Indian Institute of Technology, Guwahati, 781 001, India  
SO React. Funct. Polym. (2000), 46(2), 101-107  
CODEN: RFPOF6; ISSN: 1381-5148  
PB Elsevier Science B.V.  
DT Journal  
LA English  
CC 35-5 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 76
- AB The catalytic reaction of Co2(**DAM**)7Cl4 with phenolic compds. such as phenol, p-cresol, o-cresol, m-cresol etc. in the presence of **hydrogen** peroxide gave C-O bonded oligomers (1-4). The oligomers were characterized by NMR, IR, elemental anal. The Mn values of 1-4 were 3417, 3494, 3438 and 3550, resp. The oligomers contain OH end groups.

The oligomer 1 has resistance profile such that it increases to 50.degree.C and then falls exponentially in the region of 50 to 170.degree.. The resistance of 2 and 4 are similar to semiconductor in the range of 30-180.degree.C. The oligomer 3 has a resistance profile such that it decreases from 30 to 100.degree.C and then increases from 100 to 140.degree. and once again falls in the region of 140-200.degree.. The oligomer 4 has an ESR signal at 3220 G and shows the presence of a free radical. The intensity of this signal increases ten times upon heating to 90.degree..

ST polyphenol oxidative polymn **cobalt catalyst**

IT Polymerization **catalysts**

(oxidative; polyphenols prepd. by **cobalt(II)** catalyzed oxidative polymn.)

IT Electric resistance

(polyphenols prepd. by **cobalt(II)** catalyzed oxidative polymn.)

IT Polyoxyphenylenes

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(polyphenols prepd. by **cobalt(II)** catalyzed oxidative polymn.)

IT 57-71-6D, **cobalt** trinuclear complex 7440-48-4D, **Cobalt**, diacetyl monoxime trinuclear complex

RL: CAT (Catalyst use); USES (Uses)

(polyphenols prepd. by **cobalt(II)** catalyzed oxidative polymn.)

IT 25134-02-5P, o-Cresol homopolymer 25667-40-7P, Poly(1,4-phenylene oxide) 27073-41-2P, Phenol polymer 27289-33-4P 27289-34-5P, p-Cresol homopolymer

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(polyphenols prepd. by **cobalt(II)** catalyzed oxidative polymn.)

RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD  
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L26 ANSWER 8 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 2000:333039 HCAPLUS

TI Low-temperature methane decomposition on various carbon-supported **cobalt catalysts**.

AU Zhang, Zhanguo; Haraguchi, K.; Yoshida, Tadashi

CS Energy Resources Division, Hokkaido National Industrial Research Institute, Sapporo, 062-8517, Japan

SO Book of Abstracts, 219th ACS National Meeting, San Francisco, CA, March 26-30, 2000 (2000), PETR-051 Publisher: American Chemical Society, Washington, D. C.  
CODEN: 69CLAC

DT Conference; Meeting Abstract

LA English

AB It has been demonstrated in previous studies that both decompn. and **hydrogenation** reactions in the two-step non-oxidative homologation of methane were catalytic surface reaction and that the highest conversion of methane to C2+ hydrocarbons was reached at very low carbon coverages. Therefore, the high **dispersion of active metal** would be of great significance for increasing methane conversion and reducing the amt. of **catalyst** used. In order to develop such high dispersed **catalysts, Co catalysts** supported on various carbons with surface area from 80-2990m2/g were prepd. in this study. The characterization of **catalysts** was conducted by using BET adsorption, XRD anal., H2-TPR and H2-TPD techniques and the activity of the **catalysts** was tested by both CH4-TPR and methane decompn. at a const. temp. of 450.degree.C, resp. The measurements of BET adsorption showed that carbons with surface area higher than 1000m2/g were of much high capacity for the loading of **Co**, in comparison with conventional SiO2 support. Further, from the results of XRD anal., H2-TPR and H2-TPD, it was found that **Co** supported on these high surface area carbons was very well dispersed. On the other hand, the results of activity tests showed that the **catalysts** supported by these carbons with high surface areas, in comparison with **Co/SiO2**, lowered the beginning temp. of **hydrogen** evolution in the CH4-TPR and increased a great deal the initial prodn. rate of **hydrogen** in the decompn. reaction at 450.degree.C, resp. It is clear that the high activities of carbon supported **Co catalysts** resulted from their high dispersion. In addn., it was also found that the molar ratio of reacted CH4 to produced H2 was great than 0.5 within the initial 80 s in the methane decompn. at 450.degree.C. It suggests that CHx(x<4) species, which are very important to the prodn. of C2+ in the second step **hydrogenation** reaction, were formed on the surface of **Co** metal.

L26 ANSWER 9 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 2000:168927 HCAPLUS

DN 132:334835

TI **Cobalt(II)** diacetylmonoxime complex-catalysed oxidative coupling reactions of few aromatic compounds

AU Puzari, A.; Baruah, J. B.

CS Department of Chemistry, Indian Institute of Technology, Guwahati, India

SO J. Mol. Catal. A: Chem. (2000), 153(1-2), 1-6

CODEN: JMCCF2; ISSN: 1381-1169

PB Elsevier Science B.V.

DT Journal

LA English

CC 35-3 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 45

AB Catalytic amt. of a diacetylmonoxime **cobalt(II)** chloride complex [A] along with **hydrogen** peroxide reacts with toluene to give benzylalc., benzaldehyde and trace amt. of p-cresol and o-cresol. Similar catalytic reaction of aniline gives C-N-bonded oligomer having Mn and Mw of 1256 and 1892, resp. Mass spectra detd. by MALDI suggests the polyaniline to have highest mass from 14 units of aniline with CoCl<sub>2</sub> unit attached at the end. The oligomer thus formed have semiconducting properties. Similar reaction of phenol with **cobalt(II)** diacetylmonoxime (**Co-DAM**) complex in the presence of **hydrogen** peroxide gives C-O-bonded polyphenol. The reaction of 2-aminophenol with [A] and **hydrogen** peroxide leads to aggregate that has property of irreversible thermoelec. sensor. ESR suggests this property to originate from free radical present in the aggregate. Substituted aniline such as 2,4-dimethoxyaniline can also form low mol. aggregate from similar reaction that has semiconducting property in the range of 35.degree.C-180.degree.C.

ST **cobalt** diacetylmonoxime complex oxidative coupling  
catalyst; dimethoxyaniline **cobalt** diacetylmonoxime  
complex oxidative coupling; aminophenol **cobalt** diacetylmonoxime  
complex oxidative coupling

IT Oxidation catalysts  
(**cobalt** diacetylmonoxime complex-catalyzed oxidative coupling  
reactions of arom. compds.)

IT Polyanilines  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(**cobalt** diacetylmonoxime complex-catalyzed oxidative coupling  
reactions of arom. compds.)

IT Polymerization catalysts  
(oxidative; **cobalt** diacetylmonoxime complex-catalyzed  
oxidative coupling reactions of arom. compds.)

IT Compd. [Co<sub>2</sub>(MeCOCNOHMe)<sub>7</sub>Cl<sub>4</sub>], IR 2916 cm<sup>-1</sup>  
RL: CAT (Catalyst use); SPN (Synthetic preparation);  
PREP (Preparation); USES (Uses)

IT 57-71-6DP, Diacetylmonoxime, metal complexes 7440-48-4DP, **Cobalt**  
, diacetylmonoxime complex  
RL: CAT (Catalyst use); SPN (Synthetic preparation);  
PREP (Preparation); USES (Uses)  
(**cobalt** diacetylmonoxime complex-catalyzed oxidative coupling  
reactions of arom. compds.)

IT 57-71-6, Diacetylmonoxime 108-88-3, reactions 7791-13-1,  
**Cobalt(II)** chloride hexahydrate  
RL: RCT (Reactant)

(**cobalt** diacetylmonoxime complex-catalyzed oxidative coupling  
reactions of arom. compds.)  
IT 25233-30-1P, Polyaniline 25668-01-3P 27073-41-2P, Phenol polymer  
267428-75-1P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(cobalt diacetylmonoxime complex-catalyzed oxidative coupling  
reactions of arom. compds.)

RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD  
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L26 ANSWER 10 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1999-321606 [27] WPIX

DNN N1999-241620 DNC C1999-094680

TI Oxidation **catalyst** for fuel battery - has a complex oxide of  
base metal, platinum group metal and rare earth **metal** which is  
**dispersed** in **activated** alumina and coated on integrated  
ceramic carrier.

DC E36 J04 L03 X16

PA (NSMO) NISSAN MOTOR CO LTD

CYC 1

PI JP 11114423 A 19990427 (199927)\* 11p B01J023-63

ADT JP 11114423 A JP 1997-284066 19971016

PRAI JP 1997-284066 19971016

IC ICM B01J023-63

ICS C01B003-56; H01M008-06

AB JP 11114423 A UPAB: 19990714

NOVELTY - A complex oxide of a base metal such as copper containing  
platinum group metal and rare earth **metal** is **dispersed**  
in **activated** alumina and coated on the surface of a ceramic  
integrated carrier, to form the **catalyst** which selectively  
oxidizes carbon-monoxide (CO) in **hydrogen** gas.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the  
following: (i) Manufacture of oxidation **catalyst** which involves  
hydrothermal reaction of a carbonate with the intermediate formation of  
bicarbonate compound. (ii) method of removing CO from mixed gas  
containing **hydrogen** as the principal component and also oxygen  
and CO. CO is selectively converted to carbon dioxide  
(CO2), which is separated from the gaseous mixture.

USE - For fuel battery used as electric power generator, car battery system etc.

ADVANTAGE - The reduction of the complex metal oxide in a **catalyst** to its metals is prevented. The amount of oxygen necessary for CO oxidation is supplied and the concentration of CO is monitored thereby selective oxidation of CO is performed. Time-dependent deterioration of the **catalyst** is reduced.

Dwg.0/4

FS CPI EPI

FA AB; DCN

MC CPI: E11-Q01; E11-Q02; E31-A02; E31-D02; E31-N05B; J04-E04; L03-E04;

L03-H05

EPI: X16-C

L26 ANSWER 11 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1999:266087 HCAPLUS

DN 131:33660

TI Ru/SiO<sub>2</sub> **catalysts** prepared by the sol-gel method from Ru<sub>3</sub>(CO)<sub>12</sub>

AU Moggi, Pietro; Predieri, Giovanni; Di Silvestri, Fabio; Ferretti, Andrea

CS Dipartimento di Chimica Organica e Industriale, Universita di Parma, Parma, 43100, Italy

SO Appl. Catal., A (1999), 182(2), 257-265

CODEN: ACAGE4; ISSN: 0926-860X

PB Elsevier Science B.V.

DT Journal

LA English

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 45, 67

AB Ru/SiO<sub>2</sub> **catalysts** were prepd. by sol-gel methods from Ru<sub>3</sub>(CO)<sub>12</sub>, or [Ru<sub>3</sub>H(CO)<sub>11</sub>]-, Si(OMe)<sub>4</sub> (TMOS) and H<sub>2</sub>O, followed by thermal activation in helium up to 573 K and redn. with **hydrogen**. They were compared with Ru/SiO<sub>2</sub> corresponding material prepd. via sol-gel from RuCl<sub>3</sub>. The **catalysts** were characterized by FTIR spectra, surface area, **metal dispersion and activity tests in the Fischer-Tropsch reaction** at atm. pressure and CO/H<sub>2</sub> 1:1, in the 473-573 K temp. range. The use of **ruthenium** clusters as precursors afforded higher metal dispersions than RuCl<sub>3</sub>, as well as higher catalytic activities in the **hydrogenation of CO** (particularly in the absence of alkali or halogen ions retained in the gel structure). TEM investigations on the Ru/SiO<sub>2</sub> material, prepd. from Ru<sub>3</sub>(CO)<sub>12</sub> by sol-gel, without promoters, showed the presence of very fine metal particles homogeneously embedded in the silica matrix, with dimensions ranging from 1-4 nm.

ST **ruthenium catalyst** precursor cluster sol gel prepn;

**Fischer Tropsch catalyst ruthenium carbonyl**

sol gel method; carbon monoxide **hydrogenation ruthenium**

**silica catalyst**

IT **Fischer-Tropsch catalysts**

**Fischer-Tropsch reaction**

Sol-gel processing

(Ru/SiO<sub>2</sub> **catalysts** prepd. by the sol-gel method

from Ru<sub>3</sub>(CO)<sub>12</sub>)

IT Hydrocarbons, preparation

RL: SPN (**Synthetic preparation**); PREP (**Preparation**)

(synthesis; Ru/SiO<sub>2</sub> **catalysts** prepd. by the sol-gel

method from Ru<sub>3</sub>(CO)<sub>12</sub>)

IT 7440-18-8, **Ruthenium**, uses 7631-86-9, **Silica**, uses

12125-01-8, Ammonium fluoride 15243-33-1, Ruthenium carbonyl  
(ru3(co)12)

RL: CAT (Catalyst use); USES (Uses)

(Ru/SiO2 catalysts prepd. by the sol-gel method  
from Ru3(CO)12)

IT 630-08-0, Carbon monoxide, reactions

RL: RCT (Reactant)

(hydrogenation; Ru/SiO2 catalysts prepd.  
by the sol-gel method from Ru3(CO)12)

IT 681-84-5, Tetramethoxysilane 60496-59-5

RL: CAT (Catalyst use); USES (Uses)

(precursor; Ru/SiO2 catalysts prepd. by the sol-gel  
method from Ru3(CO)12)

RE.CNT 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD  
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L26 ANSWER 12 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1999:376154 HCAPLUS

DN 131:107348

TI Hydrogenation catalysts prepared from amorphous alloys



- with zirconium
- AU Takahashi, Takeshige; Kai, Takami
- CS Faculty of Engineering, Department of Applied Chemistry and Chemical Engineering, Kagoshima University, Kagoshima, Japan
- SO Mater. Sci. Eng., A (1999), A267(2), 207-213  
CODEN: MSAPE3; ISSN: 0921-5093
- PB Elsevier Science S.A.
- DT Journal
- LA English
- CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 56
- AB The **hydrogenation** of benzene and carbon dioxide was carried out over Zr-based **catalysts** prepd. from amorphous alloys contg. **palladium**, platinum, rhodium or nickel as the second metal. Although the **hydrogenation** activity of the alloys was very low in the virgin state, the activity gradually increased after oxidn. and redn. in a **hydrogen** atm. Characterization of the alloys revealed that the increase in surface area caused by oxidn. of zirconium was responsible for the increase in **hydrogenation** activity. When the amorphous alloys were oxidized in an oxygen atm., both the active metals for the **hydrogenation** and zirconium in the alloys were simultaneously oxidized. When the oxidized alloys were reduced in a **hydrogen** atm., the oxides of the active metals were reduced to the resp. metals, whereas zirconium remained in the oxide state. As a result, **palladium**, platinum, rhodium or nickel were highly dispersed on the produced zirconium oxide crystals. The principal advantage of a **catalyst** prepd. from an amorphous alloy is the very high **dispersion of active metal** on the surface, despite the high metal content. It is considered that amorphous alloys contg. zirconium as the second metal are attractive **catalyst** precursors for **hydrogenation**.
- ST platinum zirconium amorphous alloy **hydrogenation catalyst**; rhodium zirconium amorphous alloy **hydrogenation catalyst**; nickel zirconium amorphous alloy **hydrogenation catalyst**; benzene **hydrogenation** zirconium amorphous alloy **catalyst**; carbon dioxide **hydrogenation** zirconium amorphous alloy **catalyst**
- IT Dispersion (of materials)  
**Hydrogenation catalysts**  
Oxidation  
Reduction  
Surface area  
(**hydrogenation catalysts** prepd. from amorphous alloys with zirconium)
- IT Metallic glasses  
RL: CAT (**Catalyst use**); PRP (Properties); USES (Uses)  
(**hydrogenation catalysts** prepd. from amorphous alloys with zirconium)
- IT 11146-73-9 62943-91-3 64568-51-0 75865-87-1 81160-75-0  
115844-65-0 116294-11-2 230646-69-2 230646-70-5  
RL: CAT (**Catalyst use**); PRP (Properties); USES (Uses)  
(**hydrogenation catalysts** prepd. from amorphous alloys with zirconium)
- IT 71-43-2, Benzene, reactions 124-38-9, Carbon dioxide, reactions  
1333-74-0, **Hydrogen**, reactions  
RL: RCT (Reactant)  
(**hydrogenation catalysts** prepd. from amorphous alloys with zirconium)
- RE.CNT 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L26 ANSWER 13 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1999:53301 HCAPLUS

DN 130:72055

TI Investigations of **palladium catalysts** on different carbon supports

AU Albers, P.; Burmeister, R.; Seibold, K.; Prescher, G.; Parker, S. F.; Ross, D. K.

CS Degussa AG, Hanau, D-63403, Germany

SO J. Catal. (1999), 181(1), 145-154

CODEN: JCTLA5; ISSN: 0021-9517

PB Academic Press

DT Journal

LA English

CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic** Reaction Mechanisms)

Section cross-reference(s): 66

AB **Pd-catalysts** (5 wt%) were prepd. on various supports: powd. and pelletized activated carbon derived from pine wood or beech wood, carbon black, and graphitized carbon black. The supports were **palladized** in the original condition or after HCl-treatment. The **catalysts** were characterized with CO-chemisorption, transmission electron micrographs, and X-ray photoelectron spectrometry. The precious **metal dispersion** and the catalytic **activity** are improved by the acid treatment of activated carbon as well as carbon black supports. A selection of samples were also characterized by means of inelastic neutron scattering (INS) to study the **hydrogen**-related features of the acid modification of the carbon supports. Indications for different sensitivities of the final **Pd /C-catalysts** to catalytically driven hydrogasification effects of the supports and the impact of these effects on the precious metal dispersion and the formation of **Pd-hydrides** were obtained. The formation of mol.-like polyarom. structures was obsd. esp. on HCl-treated

activated carbon due to enhanced spillover of active **hydrogen** from the **Pd**-particles to adjacent sites on the support. The generation and accessibility of these sites on the support seems to be promoted by the removal of ash and adsorbed species. (c) 1999 Academic Press.

ST **palladium catalyst** different carbon support

IT **Hydrogenation catalysts**

(for cinnamic acid; **palladium catalysts** on different carbon supports)

IT **Catalyst supports**

**Catalysts**

Dispersion (of materials)

Particle size distribution

(**palladium catalysts** on different carbon supports)

IT 7440-05-3, **Palladium**, uses 7440-44-0, Carbon, uses

RL: **CAT (Catalyst use)**; PRP (Properties); USES (Uses)

(**palladium catalysts** on different carbon supports)

IT 7647-01-0, **Hydrogen** chloride, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)

(**palladium catalysts** on different carbon supports)

RE.CNT 46 THERE ARE 46 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L26 ANSWER 14 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1998-362568 [31] WPIX

CR 1994-007502 [01]

DNC C1998-111553

TI Aqueous phase hydrogenation of organic materials - using a catalyst containing separate nickel and ruthenium phases dispersed on a support, giving high activity, long catalyst life and reduced agglomeration and sintering.

DC E19 H04 J04

IN ELLIOTT, D C; SEALOCK, L J; SEALOCK, J; SEALOCK, J L

PA (BATT) BATTELLE MEMORIAL INST

CYC 79

PI WO 9826869 A1 19980625 (199831)\* EN 23p B01J023-89

RW: AT BE CH DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA  
PT SD SE SZ UG ZW

W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE  
GH HU IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW  
MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU  
ZW

AU 9857273 A 19980715 (199846) B01J023-89

US 5814112 A 19980929 (199846) C10J003-00

BR 9713764 A 20000201 (200023) B01J023-89

CN 1246077 A 20000301 (200029) B01J023-89

MX 9905782 A1 19991001 (200103) B01J023-89

AU 727906 B 20010104 (200107) B01J023-89

ADT WO 9826869 A1 WO 1997-US24176 19971218; AU 9857273 A AU 1998-57273  
19971218; US 5814112 A Cont of US 1992-893701 19920605, CIP of US  
1994-227892 19940415, US 1996-775337 19961219; BR 9713764 A BR 1997-13764  
19971218, WO 1997-US24176 19971218; CN 1246077 A CN 1997-181764 19971218;  
MX 9905782 A1 MX 1999-5782 19990618; AU 727906 B AU 1998-57273 19971218

FDT AU 9857273 A Based on WO 9826869; US 5814112 A CIP of US 5616154; BR  
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Based on WO 9826869

PRAI US 1996-775337 19961219; US 1992-893701 19920605; US 1994-227892  
19940415

IC ICM B01J023-89; C10J003-00

ICS C01B003-32; C02F001-02

AB WO 9826869 A UPAB: 20010202

Aqueous phase hydrogenation of organic materials comprises: (a) providing a liquid reactant mixture containing liquid water and the organic material in a pressure reactor; (b) adding a particulate catalyst, each particle comprising a porous support containing (i) a deposited reduced nickel metal catalyst phase first phase; and (ii) an added ruthenium metal as a separate and distinct dispersed second phase, in which the amount of ruthenium phase is sufficient to resist agglomeration or sintering of the nickel phase; and (c) maintaining the liquid reactant mixture at 150-350 deg. C and a hydrogen overpressure.

USE - The hydrogenation reaction comprises saturation of multiple bonds, reduction of oxygen functional groups (e.g. ketones,

aldehydes, lactones and carboxylic acids), hydrogenolysis (e.g. reduction of alcohols and phenolics), scission of ether linkages, corresponding reactions of organically bound nitrogen, hydrocracking and/or methane synthesis (claimed), e.g. steam reforming to produce a product gas containing methane, carbon dioxide and **hydrogen**; sorbitol conversion to ethylene glycol, propylene glycol, and glycerol; levulinic acid conversion to gamma -valerolactone; 1,4-pentanediol and methyl tetrahydrofuran, xylitol conversion to ethylene glycol and glycerol; succinic acid conversion to gamma -butyrolactone, 1,4-butanediol and tetrahydrofuran. Potential feedstocks include waste water streams, e.g. 0.5% hexamethylenediamine in water from nylon manufacture, or 2-3% mixed phenols in water from resin manufacture that would be treated primarily for waste destruction; and cheese whey, peat, or high-moisture biomass feedstocks for energy recovery systems.

ADVANTAGE - The porous support is stable during use, remaining physically intact and chemically inert without coming apart or disintegrating (claimed). The **ruthenium metal dispersed** phase increases **activity** compared to the use of nickel alone and increases the effective lifetime of the **catalyst**. The process can treat liquid organic materials having wide ranges of organic concentration, giving conversions of, e.g. 99.9%.  
Dwg.0/2

FS

CPI

FA

AB; DCN

MC

CPI: E10-E04; E10-J02B3; E10-J02D; H04-B03; H04-E04; H04-E08; H04-F02;  
H04-F02E; J04-E01; N02-C; N02-E01

L26 ANSWER 15 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1998:293872 HCAPLUS

DN 128:309766

TI A comparative evaluation of high-temperature membrane systems for catalytic processing

AU Gobina, Edward; Hou, Kaihu; Hughes, Ronald

CS Dep. Chem. Eng., Univ. Salford, Salford, M5 4WT, UK

SO Chem. Eng. Commun. (1998), 166, 157-181

CODEN: CEGCAK; ISSN: 0098-6445

PB Gordon & Breach Science Publishers

DT Journal

LA English

CC 47-9 (Apparatus and Plant Equipment)

Section cross-reference(s): 67

AB The relative performance of various composite membranes incorporated in high-temp. membrane reactors was evaluated by math. simulation. Two membrane categories (porous and dense) and 6 types of composite membrane systems (**Pd/Ag**, polyimide, silica, inert porous and **Ru**-dispersed porous silicalite zeolites, and C mol. sieve) were compared. The special case of the **Pd/Ag** composite system having imperfections (pinholes and cracks) is also considered. The industrially important reaction of ethylbenzene dehydrogenation over promoted **iron oxide catalyst** using rate const. values from the literature was studied as the model reaction. While the dense systems possess higher performance levels at lower membrane thicknesses, the porous composite systems esp. those contg. highly **dispersed active metal** particles within their micropores have advantages due to their significantly higher contact surface to vol. ratio. The study has also confirmed that high H permselectivity is a key factor in detg. reactor performance in terms of conversion enhancement.

ST simulation composite membrane catalytic processing; porous dense membrane catalytic processing evaluation; ethylbenzene dehydrogenation composite membrane comparative evaluation; **hydrogen** permselectivity

- ethylbenzene dehydrogenation composite membrane
- IT Molecular sieves  
(carbon, membrane; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT Catalysis  
Dehydrogenation **catalysts**  
Mass transfer  
Physicochemical simulation  
(comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT Membranes (nonbiological)  
(composite; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT Polyimides, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(membrane; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT Permselectivity  
(of **hydrogen** in comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT Silicalites (zeolites)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(porous membrane; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT 7440-18-8, **Ruthenium**, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(-dispersed porous membrane; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT 7440-22-4, Silver, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(-palladium membrane; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT 7440-05-3, **Palladium**, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(-silver membrane; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT 100-41-4, Ethylbenzene, reactions  
RL: RCT (Reactant)  
(comparative evaluation of high-temp. membrane systems for catalytic dehydrogenation of)
- IT 7631-86-9, Silica, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(membrane; comparative evaluation of high-temp. membrane systems for catalytic processing)
- IT 1333-74-0, **Hydrogen**, processes  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(permselectivity in comparative evaluation of high-temp. membrane systems for catalytic processing)

L26 ANSWER 16 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1997:283335 HCAPLUS

DN 126:295391

TI **Metal dispersion and catalytic activity in Pd catalysts for methane combustion**

AU Dalla-Betta, R. A.; Loffler, D. G.; Magno, S.

CS Catalytica Combustion Systems, Inc., Mountain View, CA, 94043, USA

SO Prepr. - Am. Chem. Soc., Div. Pet. Chem. (1997), 42(1), 163-165

CODEN: ACPCAT; ISSN: 0569-3799

PB American Chemical Society, Division of Petroleum Chemistry

DT Journal

- LA English  
CC 51-12 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67  
AB The light-off temp. of zirconia-supported **palladium catalysts** for methane combustion can be calcd. from the **hydrogen** adsorption uptake of the wash coat powder. This correlation constitutes a useful tool for designing combustion **catalysts** for gas turbine applications.  
ST zirconia **palladium catalyst** methane combustion; metal dispersion **palladium** combustion **catalyst**; lightoff temp zirconia **palladium** combustion **catalyst**  
IT Chemisorption  
Combustion **catalysts**  
(**metal dispersion** and catalytic activity in **Pd catalysts** for methane combustion)  
IT 1314-23-4, Zirconium oxide (ZrO<sub>2</sub>), uses 7440-05-3, **Palladium**, uses  
RL: CAT (Catalyst use); USES (Uses)  
(**metal dispersion** and catalytic activity in **Pd catalysts** for methane combustion)  
IT 74-82-8, Methane, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(**metal dispersion** and catalytic activity in **Pd catalysts** for methane combustion)
- L26 ANSWER 17 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1997:162979 HCAPLUS  
TI **Metal dispersion** and catalytic activity in **Pd catalysts** for methane combustion  
AU Dalla Betta, R. A.; Loffler, D. G.; Magno, S.  
CS Catalytica Combustion Systems, Inc., Mountain View, CA, 94043, USA  
SO Book of Abstracts, 213th ACS National Meeting, San Francisco, April 13-17 (1997), PETR-058 Publisher: American Chemical Society, Washington, D. C.  
CODEN: 64AOAA  
DT Conference; Meeting Abstract  
LA English  
AB Characterization of **Pd-based catalysts** for methane combustion frequently include measuring metal dispersion using either **H<sub>2</sub>** or **CO** chemisorption. In spite of uncertainties derived from the formation of **palladium** oxides under reaction conditions, those techniques generally result in reproducible results. Yet, the correlation of catalytic activity with phys. properties of the **catalyst** is not well established. Literature reports suggest that, under reaction conditions, bulk **palladium** oxide is formed. Oxidn. breaks apart the metal crystallites, so that most of the oxide participates in the reaction. This process may be reversed when the sample is reduced prior to measuring **hydrogen** uptake. We have prepd. a series of **Pd-based catalysts** for methane combustion with different metal loading. The catalytic activity of the samples was correlated with metal dispersion measured using **CO** and **H<sub>2</sub>** chemisorption. The results suggest a linear correlation between **hydrogen** chemisorption and **catalyst** activity for samples with relatively high metal dispersion. This correlation seems to break down for poorly dispersed samples.
- L26 ANSWER 18 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1997:33798 HCAPLUS  
DN 126:62577  
TI Method of liquefaction of waste plastics and of **co**-liquefaction of waste plastics and coal

IN Huffman, Gerald P.; Taghiei, M. Mehdi  
 PA University of Kentucky Research Foundation, USA  
 SO Can. Pat. Appl., 20 pp.  
 CODEN: CPXXEB  
 DT Patent  
 LA English  
 IC ICM C10G001-08  
 CC 51-24 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 60

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CA 2171803	AA	19960916	CA 1996-2171803	19960314
PRAI	US 1995-403985		19950315		
AB	A method for the liquefaction of waste plastic in a reaction vessel, comprising the steps of: charging the reaction vessel with waste plastic and a slurring agent wherein the wt. ratio of slurring agent to waste plastic is substantially between 0 and 5:1; charging the reaction vessel with a processing gas, selected from a group consisting of hydrogen, nitrogen and mixts. thereof, to a pressure between 15-3,000 psig cold; contacting the waste plastic, slurring agent and processing gas in the reaction vessel with a catalyst selected from a group consisting of zeolites, metal impregnated zeolites, ion exchanged zeolites, hydrogenated zeolites, silica-alumina, metal-doped silica-alumina, activated clays, activated fly ashes; highly dispersed metal oxides, oxyhydroxides and ferrihydrites; sulfated metal oxides, oxyhydroxides and ferrihydrites; secondary metal substituted oxides, oxyhydroxides and ferrihydrites; acid treated metal oxides, oxyhydroxides and ferrihydrites; and any mixts. thereof; heating the waste plastic, slurring agent, processing gas and catalyst in the reaction vessel to a temp. of substantially 350-500.degree. for a residence time of substantially 15-120 min; and recovering resulting liquefied products.				
ST	liquefaction waste plastic coal				
IT	Fly ash				
	RL: CAT (Catalyst use); USES (Uses) (activated; method of liquefaction of waste plastics and of co-liquefaction of waste plastics and coal)				
IT	Waste plastics (method of liquefaction of waste plastics and of co-liquefaction of waste plastics and coal)				
IT	Activated clays Aluminosilicates, uses Zeolite HZSM-5 Zeolites (synthetic), uses RL: CAT (Catalyst use); USES (Uses) (method of liquefaction of waste plastics and of co-liquefaction of waste plastics and coal)				
IT	Coal, processes RL: PEP (Physical, engineering or chemical process); PROC (Process) (method of liquefaction of waste plastics and of co-liquefaction of waste plastics and coal)				
IT	Naphtha Rubber, uses RL: TEM (Technical or engineered material use); USES (Uses) (slurring agent; method of liquefaction of waste plastics and of co-liquefaction of waste plastics and coal)				
IT	Petroleum refining residues (vacuum distn., slurring agent; method of liquefaction of waste plastics and of co-liquefaction of waste plastics and coal)				



- IT Petroleum refining  
(waste plastic liquefaction; method of liquefaction of waste plastics and of **co**-liquefaction of waste plastics and coal)
- IT 1333-74-0, **Hydrogen**, uses 7727-37-9, Nitrogen, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(method of liquefaction of waste plastics and of **co**-liquefaction of waste plastics and coal)
- IT 119-64-2, 1,2,3,4-Tetrahydronaphthalene 613-31-0, Dihydroanthracene 20330-24-9, Hexahydropyrene  
RL: TEM (Technical or engineered material use); USES (Uses)  
(slurrying agent; method of liquefaction of waste plastics and of **co**-liquefaction of waste plastics and coal)
- IT 624-92-0, Dimethyl disulfide 7704-34-9, Sulfur, reactions 7783-06-4, Dihydrogen sulfide, reactions  
RL: RCT (Reactant)  
(sulfur donor; method of liquefaction of waste plastics and of **co**-liquefaction of waste plastics and coal)
- L26 ANSWER 19 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1996:11995 HCAPLUS  
DN 124:127959  
TI Preparation of **hydrogenation catalysts** from amorphous alloys  
AU Takahashi, Takeshige; Kai, Takami  
CS Dep. Applied Chem. and Chem. Eng., Kagoshima Univ., Kagoshima, 890, Japan  
SO Kagaku Kagaku Ronbunshu (1995), 21(6), 961-71  
CODEN: KKRBAW; ISSN: 0386-216X  
DT Journal  
LA Japanese  
CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic** Reaction Mechanisms)  
Section cross-reference(s): 25, 56
- AB **Hydrogenation** of benzene and carbon dioxide was carried out over **catalysts** prep'd. from amorphous alloys contg. zirconium. The **hydrogenation** activity of the alloys was very low in the virgin state, but the activity gradually increased in the order of oxidn., redn. in a **hydrogen** atm. and **hydrogenation**. Characterization of the amorphous alloys revealed that the increase in surface area caused by oxidn. of zirconium was responsible for the increase in catalytic activity. When the alloys were oxidized in an oxygen atm. the active metal atoms for **hydrogenation** and zirconium in the alloys were simultaneously oxidized. When the oxidized alloys were treated in a **hydrogen** atm., **palladium**, platinum and nickel oxides were reduced to the resp. metal atoms, whereas zirconium oxide remained. As a result, **palladium**, platinum or nickel **catalysts** supported on zirconium oxide were prep'd. from the amorphous alloys. The principal advantage of a **catalyst** prep'd. from an amorphous alloy was high **dispersion** of **active metal** on the surface, despite the high content of metal. Amorphous alloys contg. zirconium are considered to be an attractive **catalyst** precursor for **hydrogenation**.
- ST **hydrogenation catalyst** prepn zirconium amorphous alloy
- IT **Hydrogenation catalysts**  
(prepn. of **hydrogenation catalysts** from amorphous alloys)
- IT Metallic glasses  
RL: CAT (Catalyst use); USES (Uses)  
(prepn. of **hydrogenation catalysts** from amorphous alloys)
- IT 71-43-2, Benzene, reactions 124-38-9, Carbon dioxide, reactions

RL: RCT (Reactant)

(hydrogenation of; prepn. of hydrogenation catalysts from amorphous alloys)

IT 1314-23-4, Zirconia, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 11146-74-0  
56293-95-9 72211-92-8 75865-90-6 80740-85-8 82283-10-1  
107529-41-9 173104-36-4 173104-37-5 173104-38-6 173104-39-7  
173104-40-0

RL: CAT (Catalyst use); USES (Uses)

(prepn. of hydrogenation catalysts from amorphous alloys)

L26 ANSWER 20 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1995:799707 HCAPLUS

DN 123:209779

TI Preparation of highly dispersed supported catalysts by ultrasound

AU Bianchi, C. L.; Carli, R.; Fontaneto, C.; Ragaini, V.

CS Department Physical Chemistry and Electrochemistry, University Milan, Milan, 20133, Italy

SO Stud. Surf. Sci. Catal. (1995), 91(Preparation of Catalysts VI), 195-1100  
CODEN: SSCTDM; ISSN: 0167-2991

DT Journal

LA English

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

AB Palladium supported on alumina or active carbon catalysts were prepd. using ultrasound during the prepn. steps. A large increase in the metal dispersion and in the catalytic activity of the samples, tested during the redn. of acetophenone with flowing hydrogen, was found.

ST highly dispersed supported catalyst ultrasound;

palladium dispersed supported catalyst prepn ultrasound

IT Reduction catalysts

(for acetophenone; prepn. of highly dispersed supported catalysts by ultrasound)

IT Catalysts and Catalysis

Sound and Ultrasound

(prepn. of highly dispersed supported catalysts by ultrasound)

IT 1344-28-1, Alumina, uses 7440-05-3, Palladium, uses 7440-44-0, Carbon, uses

RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(prepn. of highly dispersed supported catalysts by ultrasound)

L26 ANSWER 21 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1994:461453 HCAPLUS

DN 121:61453

TI hydriding properties of Mg-based hydrogen storage materials prepared chemically from a homogeneous phase

AU Imamura, Hayao; Nakamura, Masahiro

CS Faculty of Engineering, Yamaguchi University, Ube, 755, Japan

SO Z. Phys. Chem. (Munich) (1994), 183(1-2), 157-62

CODEN: ZPCFAX; ISSN: 0044-3336

DT Journal

LA English

CC 52-3 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 56, 78

AB Dispersion of Mg atoms into NH<sub>3</sub> at 77 K using a metal vapor technique was used to produce a homogeneous soln. of dissolved Mg metal in liq. ammonia. The Mg/NH<sub>3</sub> soln. was used to prep. novel Mg-based H storage materials. Materials prepd. include: active, small Mg metals crystd. out of the soln. in the presence or absence of catalytically active Ni powders (Mg-Ni or Mg). The Mg metal was highly dispersed on an active carbon (AC) support with high surface area by impregnating the AC with the soln. of Mg/NH<sub>3</sub>. By using AC on which active Ni, Ru or Pt metals had been highly dispersed, the prepn. of samples was further extended to include binary systems (Mg-Ni/AC, Mg-Ru/AC or Mg-Pt/AC). Samples characteristics were correlated with the prepn. methods. These Mg-based compds. were extremely active toward H absorption.

ST hydrogen absorption magnesium ammonia dispersion

IT Absorption

(of hydrogen, by magnesium dispersed in ammonia, role of metals in)

IT 1333-74-0, Hydrogen, properties

RL: PRP (Properties)

(absorption of, by magnesium/ammonia dispersion, hydriding characteristics in, for storage)

IT 7440-44-0, Carbon, uses

RL: USES (Uses)

(activated, hydrogen absorption by magnesium dispersion in ammonia in presence of)

IT 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses

RL: CAT (Catalyst use); USES (Uses)

(catalyst, hydrogen absorption by magnesium in presence of, for storage)

IT 7664-41-7, Ammonia, uses

RL: USES (Uses)

(dispersant, magnesium hydriding characteristics in, for storage)

IT 7439-95-4, Magnesium, properties

RL: PRP (Properties)

(hydrogen absorption by ammonia dispersion of, hydriding characteristics in, for storage)

L26 ANSWER 22 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1994:16395 HCAPLUS

DN 120:16395

TI Influence of preparation method on the characteristics of nickel/sepiolite catalysts

AU Anderson, James A.; Daza, Loreto; Fierro, Jose Luis G.; Rodrigo, M. Theresa

CS Inst. Catal. Petroleoquim., CSIC, Madrid, 28049, Spain

SO J. Chem. Soc., Faraday Trans. (1993), 89(19), 3651-7

CODEN: JCFTEV; ISSN: 0956-5000

DT Journal

LA English

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

AB Two series of nickel catalysts supported on sepiolite were prepd. by impregnation and pptn. procedures, and the resultant materials characterized in their reduced states. FTIR of adsorbed CO and XPS were used to study the surfaces of the materials and the degree of redn. was calcd. gravimetrically. The metal dispersion/particle size was calcd. from hydrogen adsorption isotherms at 298 K, and the hydrogenation of benzene used as a test reaction of the metal sites. No correlation between activity and metal

**dispersion** was found and turnover frequencies indicate an apparent structure sensitivity of the reaction in addn. to an apparent influence of the prepn. method. However, similarity between the form of plots of turnover frequency-particle size and degree of redn.-particle size, suggests that the apparent structure sensitivity is the result of the presence of unreduced Ni in the **catalyst** surfaces. The presence of this unreduced Ni acts as a diluent in the Ni surface, thereby reducing the size of Ni ensembles.

ST nickel sepiolite **catalyst** prepn method characteristics;

**hydrogenation catalyst** nickel sepiolite

IT **Catalysts** and Catalysis

**Hydrogenation catalysts**

(nickel-sepiolite, influence of prepn. method on characteristics of)

IT Particle size

Reduction

(of nickel-sepiolite **catalysts**, influence of prepn. method on)

IT 63800-37-3, Sepiolite

RL: **CAT (Catalyst use)**; USES (Uses)

(**catalyst** from nickel and, influence of prepn. method on characteristics of)

IT 7440-02-0, Nickel, uses

RL: **CAT (Catalyst use)**; USES (Uses)

(**catalyst** from sepiolite and, influence of prepn. method on characteristics of)

L26 ANSWER 23 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1995:956253 HCAPLUS

DN 123:345294

TI Chemical role of Athabasca oil sand bitumen for high conversion of coal-heavy oil coprocessing and evaluation of highly dispersed metal **catalysts**

AU Higashine, Jun; Kido, Akihiro; Takahashi, Katsuyuki; Miyake, Mikio; Nomura, Masakatsu

CS Faculty Engineering, Osaka University, Suita, 565, Japan

SO Proc. - Annu. Int. Pittsburgh Coal Conf. (1993), 10th, 241-5

CODEN: PICNE4; ISSN: 1075-7961

DT Journal

LA English

CC 51-14 (Fossil Fuels, Derivatives, and Related Products)

AB A mixt. of coal and pure solvent such as 1-methylnaphthalene (MN), biphenyl (BP), Decaline (DC), and n-eicosane (EC) with 1 to 3 ratio was coprocessed in a 70 mL autoclave at 420 .degree.C for 1 h in the presence of H<sub>2</sub> (50 kg/cm<sup>2</sup> at room temp.) and sulfided Ni-Mo/Al<sub>2</sub>O<sub>3</sub>

**catalyst**. The resulting reactivity was compared with that of coal with Athabasca oil sand bitumen (AOB). As for the run with Wandoan subbituminous coal, HS (hexane sol. fraction) yield was high with AOB compared with the run in the presence of DC and EC, while the reverse was obsd. with HS yield from the run with Taiheiyo subbituminous coal. These results were explained by referring to the two features of solvent, that is a dispersant of radicals produced and a **hydrogen** shuttler.

The **activity** of highly **dispersed metal**

**catalyst** from Fe(CO)<sub>5</sub>, Co<sub>2</sub>(CO)<sub>8</sub>, and

Ru<sub>3</sub>(CO)<sub>12</sub> for this coprocessing reaction (Wandoan coal and AOB) was also examd.

ST oil sand bitumen coal coprocessing **catalyst**

IT Coal liquefaction

(chem. role of Athabasca oil sand bitumen for high conversion of coal-heavy oil coprocessing)

IT Coal liquefaction **catalysts**

## Tar oils

(chem. role of Athabasca oil sand bitumen for high conversion of coal-heavy oil coprocessing and evaluation of highly dispersed metal catalysts)

- IT 10210-68-1 13463-40-6, Iron pentacarbonyl 15243-33-1, Ruthenium carbonyl ( $\text{Ru}_3(\text{CO})_{12}$ )  
RL: CAT (Catalyst use); USES (Uses)  
(chem. role of Athabasca oil sand bitumen for high conversion of coal-heavy oil coprocessing and evaluation of highly dispersed metal catalysts)
- L26 ANSWER 24 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1994:201488 HCAPLUS  
DN 120:201488  
TI Carbon monoxide/hydrogen titration studies on Ru:Mn/alumina supported bimetallic system for the determination of metal surface area  
AU Hussain, S. Tajammul  
CS A. Q. Khan Res. Lab., Rawalpindi, Pak.  
SO J. Chem. Soc. Pak. (1993), 15(4), 234-7  
CODEN: JCSPDF; ISSN: 0253-5106  
DT Journal  
LA English  
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 66
- AB The CO/H<sub>2</sub> titrn. method was used to det. the metal surface area on Ru:Mn/Al<sub>2</sub>O<sub>3</sub> supported system. This method was based on the assumption that CO is selectively adsorbed to form a monolayer on the metal surface but is not adsorbed on the support surface and that all the adsorbed CO is hydrogenated to form CH<sub>4</sub> selectively. The data indicate that Mn covers the surface of Ru and hence the no. of active sites responsible for the prodn. of CH<sub>4</sub> is blocked by the addn. of Mn. A continuous decrease in the dispersion of the active metal is discussed in terms of ensemble affect generated by the presence of Mn on the surface of Ru.
- ST ruthenium manganese alumina catalyst metal surface; carbon monoxide titrn ruthenium manganese catalyst; hydrogen titrn ruthenium manganese catalyst
- IT Adsorption  
(carbon monoxide-hydrogen titrn. for metal surface area detn. for ruthenium-manganese/alumina catalysts)
- IT Catalysts and Catalysis  
(ruthenium-manganese/alumina, carbon monoxide-hydrogen titrn. for metal surface area detn. for)
- IT 7440-18-8, Ruthenium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts from manganese and, supported on alumina, carbon monoxide-hydrogen titrn. for metal surface area detn. for)
- IT 7439-96-5, Manganese, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts from ruthenium and, supported on alumina, carbon monoxide-hydrogen titrn. for metal surface area detn. for)
- IT 1344-28-1, Alumina, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts from ruthenium-manganese on, carbon monoxide-hydrogen titrn. for metal surface area detn. for)
- IT 1333-74-0, Hydrogen, reactions

RL: RCT (Reactant)  
(titrn. of carbon monoxide and, for metal surface area detn. for  
**ruthenium-manganese/alumina catalysts**)

IT 630-08-0, Carbon monoxide, reactions

RL: RCT (Reactant)  
(titrn. of **hydrogen** and, for metal surface area detn. for  
**ruthenium-manganese/alumina catalysts**)

L26 ANSWER 25 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1992:538664 HCAPLUS

DN 117:138664

TI Process for controlling degree of **dispersion** of **active**  
component of **metal/carrier solid catalyst**

IN Matsuura, Ikuya; Yoshida, Yasushi; Takayasu, Osamu; Nitta, Kuniaki

PA Ube Industries, Ltd., Japan

SO U.S., 6 pp.

CODEN: USXXAM

DT Patent

LA English

IC ICM B01J023-58

ICS B01J023-78

NCL 502328000

CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic** Reaction  
Mechanisms)

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5137863	A	19920811	US 1991-775086	19911011
	JP 04150950	A2	19920525	JP 1990-275371	19901016
	JP 04331704	A2	19921119	JP 1991-188392	19910426
	JP 05208801	A2	19930820	JP 1991-188391	19910426
PRAI	JP 1990-275371		19901016		
	JP 1991-188391		19910426		
	JP 1991-188392		19910426		

AB Disclosed is a process for controlling the degree of dispersion of a  
catalytically active component in the prepn. of a metal/carrier solid  
**catalyst**, which comprises dry-blending an ultrafine single-crystal  
carrier material and an active component metal material, molding the  
blend, heating and maintaining the molded body in an inert gas at a temp.  
higher than and close to the m.p. of the active component metal material,  
and heat-treating the molded body in the same atm. gas at a temp. higher  
than the decompn. temp. of the active component metal material.

ST metal dispersion control supported **catalyst**

IT **Catalysts** and Catalysis

(control of metal dispersion on supported)

IT 1309-48-4, Magnesium oxide, uses

RL: **CAT (Catalyst use)**; **USES (Uses)**

(**catalyst** from precious metal and, control of metal  
dispersion on)

IT 7440-02-0, Nickel, miscellaneous 7440-05-3, **Palladium**,  
miscellaneous 7440-06-4, Platinum, miscellaneous 7440-16-6, Rhodium,  
miscellaneous 7440-18-8, **Ruthenium**, miscellaneous

RL: MSC (Miscellaneous)

(control of dispersion of, in supported **catalyst**)

IT 74-82-8, Methane, reactions

RL: RCT (Reactant)

(conversion of, to carbon monoxide and **hydrogen**, precious  
metal-magnesium oxide **catalyst** for)

IT 630-08-0P, Carbon monoxide, preparation 1333-74-0P, **Hydrogen**,  
preparation

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of, from methane, precious metal-magnesium oxide  
catalyst for)

L26 ANSWER 26 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1992:242645 HCAPLUS

DN 116:242645

TI Process for controlling degree of **dispersion of active**  
component of **metal/carrier solid catalyst**

IN Matsuura, Ikuya; Takayasu, Osamu; Yoshida, Yasushi; Nitta, Kuniaki

PA Ube Industries, Ltd., Japan

SO Eur. Pat. Appl., 11 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM B01J037-00

ICS B01J037-08

CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic Reaction**  
Mechanisms)

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 481689	A1	19920422	EP 1991-309361	19911010
	R: DE, DK, FR, GB, IT, NL				
	JP 04150950	A2	19920525	JP 1990-275371	19901016
PRAI	JP 1990-275371		19901016		

AB Disclosed is a process for controlling the degree of dispersion of a  
**catalyst** active component in the prepn. of a metal/carrier solid  
**catalyst**, which comprises dry-blending an ultrafine single-crystal  
carrier material and an active component metal material, molding the  
blend, heating and maintaining the molded body in an inert gas at a temp.  
higher than and close to the m.p. of the active component metal material,  
and heat-treating the molded body in the same atm. gas at a temp. higher  
than the decompn. temp. of the active component metla material.

ST metal dispersion control supported **catalyst**

IT **Catalysts** and Catalysis

(supported, control of metal dispersion of)

IT 1309-48-4, Magnesium oxide, properties

RL: PRP (Properties)

(control of dispersion of metals on, for **catalysts**)

IT 7440-02-0, Nickel, properties 7440-05-3, **Palladium**, properties

7440-06-4, Platinum, properties 7440-16-6, Rhodium, properties

7440-18-8, **Ruthenium**, properties

RL: PRP (Properties)

(control of dispersion of, for supported **catalysts**)

IT 74-82-8, Methane, reactions

RL: RCT (Reactant)

(conversion of, to carbon monoxide and **hydrogen**, control of

metal dispersion on magnesium oxide of **catalysts** for)

IT 630-08-0P, Carbon monoxide, preparation 1333-74-0P, **Hydrogen**,  
preparation

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of, from methane, control of metal dispersion on magnesium  
oxide of **catalysts** for)

L26 ANSWER 27 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1991-233811 [32] WPIX

DNC C1991-101688

TI Alcohol contg. methanol a a main component, prepn. - comprising reacting  
**hydrogen** with carbon mon oxide in presence of hydrophobic

**catalyst.**

DC E17 J04

PA (MITK) MITSUI TOATSU CHEM INC

CYC 1

PI JP 03151337 A 19910627 (199132)\* 3p

JP 2764080 B2 19980611 (199828) 3p C07C031-04

ADT JP 03151337 A JP 1989-287593 19891106; JP 2764080 B2 JP 1989-287593 19891106

FDT JP 2764080 B2 Previous Publ. JP 03151337

PRAI JP 1989-287593 19891106

IC B01J027-12; B01J033-00; C07B061-00; C07C029-15; C07C031-04

ICM C07C031-04

ICS B01J027-12; B01J031-24; B01J033-00; C07C029-15; C07C029-153

ICA C07B061-00

AB JP 03151337 A UPAB: 19930928

Alcohol, mainly methanol (MC), is prepd. by reaction of H<sub>2</sub> (**hydrogen**) with CO<sub>2</sub> or with a mixed gas of CO<sub>2</sub> and CO in solvent immiscible with water or aq. MC in the presence of a hydrophobic **catalyst** used for methanol synthesis. The heterogeneous **catalyst** comprises an active component on hydrophobic carrier (e.g. polytetrafluoroethylene, black lead fluoride, etc.) or a coated known methanol synthesis **catalyst** with hydrophobic cpd. (e.g. hydrophobically (PbF<sub>2</sub>) treated Cu-Zn) are used. Cu, Pd, or Pt, etc. is used as a metal on the carrier. Zn or Cr, etc. are also carried for stabilisation and high **dispersion** of the **active metal**.

USE/ADVANTAGE - MC is effectively produced from CO<sub>2</sub> and water due to no adsorption of water on the surface of the **catalyst**.

O/O

FS CPI

FA AB; DCN

MC CPI: E10-E04E1; J04-E01; N02-D01; N02-F02; N03-D; N03-F

L26 ANSWER 28 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1991:172241 HCAPLUS

DN 114:172241

TI Study of highly dispersed rhodium cluster derived **catalysts**

AU Chen, Yu.; Chen, Yaoqiang; Jiang, Xinrong; Xie, Hue

CS Sichuan Univ., Chengdu, Peop. Rep. China

SO Fenzi Cuihua (1990), 4(2), 148-55

CODEN: FECUEN

DT Journal

LA Chinese

CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic** Reaction Mechanisms)

Section cross-reference(s): 51

AB Highly dispersed Rh<sub>4</sub>/Al<sub>2</sub>O<sub>3</sub> and Rh<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> **catalysts** were prepd.and characterized by H<sub>2</sub> chemisorption and IR spectra of adsorbedCO. The activity and selectivity of the **catalysts** undera series of H<sub>2</sub>/CO ratios were investigated in a

micro-flow reactor. The results showed that there was a high degree of metal dispersion and a uniform metal particle size on both

**catalysts**. In the process of heating in vacuum or in a CO

atm., only the twin chemisorbed CO type appeared, neither the

spectra of the linear type nor that of a bridge type was obsd. The

spectra of twin chemisorbed type disappeared in H<sub>2</sub>. Theactivity of the 2 **catalysts** increased with temp. and with higherH<sub>2</sub>/CO ratios. Both **catalysts** had high

methanation activity and selectivity, but under the same conditions.

Rh<sub>4</sub>/Al<sub>2</sub>O<sub>3</sub> had a higher activity than Rh<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>.



ST rhodium cluster alumina **catalyst** prepn characterization;  
dispersion rhodium alumina **catalyst**; **hydrogen**  
chemisorption rhodium alumina **catalyst**; carbon monoxide  
**hydrogenation** rhodium alumina **catalyst**

IT Adsorbed substances  
(carbon monoxide, on rhodium-alumina **catalysts**, IR spectra  
of, effect of **hydrogen** presence on)

IT Chemisorption  
(of **hydrogen**, on rhodium-alumina **catalysts**,  
dispersion in relation to)

IT Particle size  
(of rhodium support on alumina, catalytic activity in relation to)

IT **Catalysts** and Catalysis  
(rhodium clusters supported on alumina, prepn. and characterization of)

IT **Hydrogenation catalysts**  
(rhodium-alumina, for carbon monoxide, effect of **metal**  
**dispersion** on **activity** and selectivity of)

IT 630-08-0, Carbon monoxide, properties  
RL: PRP (Properties)  
(adsorbed, on rhodium cluster support on alumina, IR spectra of, effect  
of **hydrogen** addn. on)

IT 7440-16-6, Rhodium, uses and miscellaneous  
RL: CAT (**Catalyst use**); USES (Uses)  
(**catalysts** from alumina and, **metal**  
**dispersion** of, **activity** in **hydrogenation** of  
carbon monoxide in relation to)

IT 1333-74-0, **Hydrogen**, reactions  
RL: RCT (Reactant)  
(chemisorption of, on rhodium cluster support on alumina, dispersion in  
relation to)

L26 ANSWER 29 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1989-250073 [35] WPIX

DNC C1989-111368

TI Converting polysaccharide(s) to poly hydric alcohol(s) - by  
**hydrogenation** in presence of **catalyst** comprising  
supported metal e.g. **ruthenium** and acidic solid.

DC E17

IN HINNEKENS, H; JACOBS, P

PA (LABO) FINA RES SA; (SYNF-N) SYNFINA-OLEOFINA SA

CYC 16

PI EP 329923 A 19890830 (198935)\* EN 10p  
R: AT BE CH DE ES FR GB GR IT LI LU NL SE

DK 8900784 A 19890823 (198943)

JP 01268653 A 19891026 (198949)

US 4950812 A 19900821 (199036)

EP 329923 B1 19930421 (199316) EN 11p C07C031-26

R: AT BE CH DE ES FR GB GR IT LI LU NL SE

DE 3880477 G 19930527 (199322) C07C031-26

ES 2054877 T3 19940816 (199434) C07C031-26

ADT EP 329923 A EP 1988-870023 19880222; JP 01268653 A JP 1989-39495 19890221;

US 4950812 A US 1989-313946 19890222; EP 329923 B1 EP 1988-870023

19880222; DE 3880477 G DE 1988-3880477 19880222, EP 1988-870023 19880222;

ES 2054877 T3 EP 1988-870023 19880222

FDT DE 3880477 G Based on EP 329923; ES 2054877 T3 Based on EP 329923

PRAI EP 1988-870023 19880222

REP 1.Jnl.Ref; US 2609399

IC ICM C07C031-26

ICS B01J029-06; C07C029-14; C13K013-00

AB EP 329923 A UPAB: 19960417

Polysaccharides are converted to polyhydric alcohols by **hydrogenation** at high pressure and temp. in the presence of a **catalyst** consisting of : i) a supported metal, (being either **ruthenium**, copper, nickel or **cobalt**) dispersed on the support as to adsorb more than 0.58 molecules CO per metal atom and ii) a solid with sufficient acid functions so that the rate constant of hydrolysis of sucrose,  $k_1$ , on the **catalyst** is greater than 70% of the rate constant of **hydrogenation** of glucose,  $k_2$ , on the **catalyst**.

The supported metal is prepared by ion exchange or the decomposition of an ammine complex salt. The support may be identical to the solid, such as a synthetic acidic zeolite. The reaction temp. ranges from 348 to 523 K.

ADVANTAGE - This is a single step process combining hydrolysis and **hydrogenation** and results in high purity hexitols.

0/0

Dwg.0/0

FS CPI

FA AB; DCN

MC CPI: E10-A07; N02; N06-E

L26 ANSWER 30 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1990:105785 HCAPLUS

DN 112:105785

TI Thermal decomposition of metal carbonyls on oxide supports containing surface hydrides: a route to highly dispersed metal **catalysts** with unusual properties

AU Lisitsyn, A. S.; Golovin, A. V.; Chuvilin, A. L.; Kuznetsov, V. L.; Romanenko, A. V.; Danilyuk, A. F.; Ermakov, Yu. I.

CS Inst. Catal., Novosibirsk, 630090, USSR

SO Appl. Catal. (1989), 55(2), 235-58

CODEN: APCADI; ISSN: 0166-9834

DT Journal

LA English

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

Section cross-reference(s): 51, 66, 77

AB A method of prepn. of fairly dispersed metal **catalysts** on oxide supports is described. The Co, Fe, Fe-

Co, and Rh carbonyls, when chemisorbed on SiO<sub>2</sub> with anchored hydrides of Ti or Al and then subjected to thermal decompn., produce very small species consisting of several up to tens of metal atoms. Thermal decompn. of a heteronuclear Fe-Co cluster leads to formation of bimetallic Fe-Co particles. The Co, Fe, and Co-Fe samples so obtained possess unusual magnetic properties. On varying temp. and strength of the magnetic field, their magnetization alters in a manner specific for super-paramagnetic particles, but there is no signal of ferromagnetic resonance in ESR spectra. With increased loading of the supported Fe and Co carbonyls, both chemisorbed and weakly bound carbonyl complexes are on the surface of the support. Larger metallic crystallites are much smaller (.apprx.1 nm) than those obtained on non-modified SiO<sub>2</sub>. The metal particles in the samples show high stability to sintering under vacuum but grow in size under conditions of CO **hydrogenation** (1.5-2 nm). Carbide formation presumably takes place on the Fe **catalyst** during CO **hydrogenation**. The catalytic properties in the CO + H<sub>2</sub> reaction are affected by both the size of metal particles in the **catalysts** and the chem. nature of the support.

ST metal carbonyl thermal decompn silica support; iron silicon

- catalyst prepn carbonyl; cobalt silica catalyst prepn carbonyl; ruthenium silica catalyst prepn carbonyl; particle size catalyst prepn carbonyl
- IT Hydrogenation catalysts  
(cobalt and/or iron or rhodium supported on silica, prepd. by thermal decompn. of metal carbonyls, dispersion and activity of)
- IT Particle size  
(of cobalt and/or iron or rhodium supported on silica, prepd. by thermal decompn. of metal carbonyls, catalytic activity in relation to)
- IT Magnetic induction and Magnetization  
(of cobalt and/or iron supported on silica, prepd. by thermal decompn. of metal carbonyls, temp. dependence of)
- IT 7439-89-6P, Iron, uses and miscellaneous 7440-16-6P, Rhodium, uses and miscellaneous 7440-48-4P, Cobalt, uses and miscellaneous  
RL: CAT (Catalyst use); PREP (Preparation); USES (Uses)  
(catalysts from silica and, prepd. by thermal decompn. of adsorbed carbonyl, dispersion of)
- IT 7429-90-5, Aluminum, uses and miscellaneous 7440-32-6, Titanium, uses and miscellaneous  
RL: USES (Uses)  
(silica catalyst supports modified by, dispersion of metal formed by thermal decompn. of adsorbed metal carbonyl in relation to)
- L26 ANSWER 31 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1989:102507 HCAPLUS  
DN 110:102507  
TI Effect of the support on the catalytic activity of a platinum-rhenium catalyst  
AU Cid, R.; Pecchi, G.; Reyes, P.  
CS Fac. Cienc., Univ. Concepcion, Concepcion, Chile  
SO Bol. Soc. Chil. Quim. (1988), 33(4), 229-37  
CODEN: BOCQAX; ISSN: 0366-1644  
DT Journal  
LA Spanish  
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 22
- AB A series of Pt-Re catalysts supported on SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, and NaY zeolite with different Pt/Re ratios were prepd. Several methods were used to characterize the solids: chem. anal., a potentiometric method to measure the surface acidity, O<sub>2</sub>-H<sub>2</sub> titrns. to evaluate the metal dispersion. As a test reaction, the decompn. of methylcyclohexane in H was studied. The nature of the support had a great influence on the surface acidity, metal dispersion, activity, and stability of the catalysts. The PtRe/Al<sub>2</sub>O<sub>3</sub> catalysts are the most acidic and are better dispersed; however, they show a very fast deactivation.
- ST platinum rhenium supported catalyst acidity dispersion; silica platinum rhenium catalyst acidity dispersion; alumina platinum rhenium catalyst acidity dispersion; zeolite platinum rhenium catalyst acidity dispersion; methylcyclohexane decompn supported platinum rhenium catalyst
- IT Chemisorbed substances  
(hydrogen, on supported platinum-rhenium catalysts, oxygen titrn. of, metal dispersion in relation to)

- IT **Catalysts and Catalysis**  
(platinum-rhenium-alumina or -silica or -zeolite, acidity and metal dispersion in activities of)
- IT Decomposition **catalysts**  
(supported platinum-rhenium, for Me cyclohexane, effect of support material on activity of)
- IT Zeolites, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(NaY, **catalysts** from platinum and **rhenium** and, acidity and dispersion and activity of, effect of compn. on)
- IT 7440-15-5, **Rhenium**, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from platinum and various supports and, effect of support material on acidity and dispersion and activity of)
- IT 7440-06-4, **Platinum**, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from **rhenium** and various supports and, effect of support material on acidity and dispersion and activity of)
- IT 1333-74-0, **Hydrogen**, uses and miscellaneous  
RL: USES (Uses)  
(chemisorbed, on supported platinum-rhenium **catalysts**, titrn. of, by oxygen, metal dispersion in relation to)
- IT 7782-44-7, **Oxygen**, uses and miscellaneous  
RL: USES (Uses)  
(titrn. by, of **hydrogen** chemisorbed on supported platinum-rhenium **catalysts**, metal dispersion in relation to)
- IT 1335-30-4  
RL: RCT (Reactant)  
(zeolites, NaY, **catalysts** from platinum and **rhenium** and, acidity and dispersion and activity of, effect of compn. on)
- L26 ANSWER 32 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1988:516788 HCAPLUS  
DN 109:116788  
TI Effect of **hydrogen** chloride on the activity and dispersion of platinum and **palladium** supported on aluminum oxide  
AU Anan'in, V. N.; Pryakhina, N. Yu.; Gerasimova, L. V.; Sen'kov, G. M.; Trokhimets, A. I.  
CS Inst. Fiz.-Org. Khim., Minsk, USSR  
SO Vestsi Akad. Navuk BSSR, Ser. Khim. Navuk (1988), (3), 30-3  
CODEN: VBSKAK; ISSN: 0002-3590  
DT Journal  
LA Russian  
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
- AB A method is described for prepg. **catalysts** with enhanced activity and Pt or **Pd** dispersion which involves impregnation after Al<sub>2</sub>O<sub>3</sub> surface treatment by gaseous HCl. **Catalyst** activities were detd. for cyclohexane dehydrogenation in a flow reactor.
- ST platinum alumina **catalyst** prepn impregnation; **palladium** alumina **catalyst** dehydrogenation; **hydrogen** chloride treatment alumina surface
- IT **Catalysts and Catalysis**  
Dehydrogenation **catalysts**  
(**palladium** or platinum, on alumina supports, **hydrogen** chloride pretreatment of support in relation to enhanced activity of)
- IT 7647-01-0, **Hydrogen** chloride, uses and miscellaneous  
RL: USES (Uses)  
(alumina **catalyst** support pretreatment with, enhanced activity and metal dispersion in relation

- to)  
IT 1344-28-1, Alumina, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst support, hydrogen chloride pretreatment effects on metal dispersion on)  
IT 7440-05-3P, Palladium, uses and miscellaneous 7440-06-4P, Platinum, uses and miscellaneous  
RL: CAT (Catalyst use); PREP (Preparation); USES (Uses)  
(catalysts, on alumina supports, prepd. by impregnation, hydrogen chloride pretreatment of support effect on)
- L26 ANSWER 33 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1988:535765 HCAPLUS  
DN 109:135765  
TI Effect of **palladium** concentration on the state and activity of **palladium/.gamma.-alumina catalysts**  
AU Parvulescu, Vasile; Sandulescu, Ioan; Grecu, Nicoleta; Contescu, Cristian; Nicolescu, Ioan V.  
CS Natl. Inst. Chem., Bucharest, Rom.  
SO Rev. Roum. Chim. (1988), 33(1), 3-11  
CODEN: RRCHAX; ISSN: 0035-3930  
DT Journal  
LA English  
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 22  
AB H chemisorption and EPR measurements on **Pd/.gamma.-Al2O3 catalysts** were performed to det. the effect of **Pd** concn. on the state and the dispersion of the metal on the support. From the EPR spectra, **Pd+1** clusters were found. The EPR and dispersion results are discussed in connection with the activity measurements.  
ST **palladium alumina catalyst dispersion; hydrogen chemisorption palladium alumina catalyst; cluster palladium alumina catalyst**  
IT Chemisorption  
(of **hydrogen**, on **palladium-alumina catalysts**, particle size in relation to)  
IT Particle size  
(of **palladium** supported on alumina, effect of **palladium** loading on, activity in relation to)  
IT **Hydrogenation catalysts**  
(**palladium-alumina**, effect of **metal** loading on dispersion and activity of)  
IT 7440-05-3, Palladium, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts from alumina and, effect of **palladium** concn. on dispersion and activity of)  
IT 1333-74-0, Hydrogen, reactions  
RL: RCT (Reactant)  
(chemisorption of, on **palladium-alumina catalysts**, particle size in relation to)
- L26 ANSWER 34 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1988:97265 HCAPLUS  
DN 108:97265  
TI Catalyst for preparation of trichlorosilane from silicon tetrachloride  
IN Morimoto, Shiro  
PA Osaka Titanium Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM C01B033-107  
ICS B01J027-128  
CC 49-8 (Industrial Inorganic Chemicals)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 62235205	A2	19871015	JP 1986-79486	19860407
OS	CASREACT 108:97265				
AB	Si(s) and a highly active H-redn. chloride-dispersed transition metal catalyst which is supported on spherical, gas-permeable naphthalene-processed petroleum pitch are placed in a reaction chamber and gaseous SiCl <sub>4</sub> -H <sub>2</sub> is fed into the chamber to give SiHCl <sub>3</sub> . Effective conversion of SiCl <sub>4</sub> into SiHCl <sub>3</sub> is achieved with short contact time. Aq. CoCl <sub>2</sub> soln. was mixed with Kureha Beads BAC-MP (support) and dried to give a catalyst precursor carrying Co chloride which was treated 5-6 h at 500.degree. with Si(s) in H <sub>2</sub> (g) flow. A mixt. of 0.186 mmol/min SiCl <sub>4</sub> and 0.421 mmol/min H <sub>2</sub> was fed into a reaction chamber contg. the catalyst (heated to 500.degree.) to give 88.7 mol% SiCl <sub>4</sub> and 11.0 mol% SiHCl <sub>3</sub> in 25.0 s residence time.				
ST	silicon chloride hydride prepn catalyst; chlorosilane prepn catalyst				
IT	7440-02-0, Nickel, uses and miscellaneous 7440-05-3, Palladium, uses and miscellaneous 7440-06-4, Platinum, uses and miscellaneous 7440-16-6, Rhodium, uses and miscellaneous 7440-48-4D, Cobalt, supported on pitch beads 7440-50-8, Copper, uses and miscellaneous RL: CAT (Catalyst use); USES (Uses) (catalyst, in redn. of silicon tetrachloride)				
IT	10025-78-2P, Trichlorosilane RL: PREP (Preparation) (prepn. of, from silicon tetrachloride, supported catalyst for)				
IT	10026-04-7, Silicon tetrachloride RL: RCT (Reactant) (redn. of, supported catalyst for, in prepn. of trichlorosilane)				

L26 ANSWER 35 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1987:215844 HCAPLUS

DN 106:215844

TI The effect of catalyst preparation on catalytic activity. II.  
The design of nickel/alumina catalysts prepared by wet impregnation

AU Huang, Y. J.; Schwarz, J. A.

CS Dep. Chem. Eng. Mater. Sci., Syracuse Univ., Syracuse, NY, 13244, USA

SO Appl. Catal. (1987), 30(2), 255-63

CODEN: APCADI; ISSN: 0166-9834

DT Journal

LA English

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 67

AB Design equations are presented for Ni/Al<sub>2</sub>O<sub>3</sub> catalysts prepd. by wet impregnation from nickel nitrate soln. in contact with a .gamma.-Al<sub>2</sub>O<sub>3</sub> support. The metal dispersion, activity for Cl-3 formation from 3:1 H<sub>2</sub>-CO, and the carbon deposited during reaction are predictable based solely on the properties

- of the electrolytes from which these **catalysts** are formed.
- ST nickel **catalyst hydrogenation** carbon monoxide;  
hydrocarbon prodn carbon monoxide
- IT Kinetics of **hydrogenation**  
(of carbon monoxide in prepn. of hydrocarbons, **catalyst**  
prepn. method effect on)
- IT **Hydrogenation catalysts**  
(supported, nickel, for carbon monoxide in prepn. of hydrocarbons,  
activity of, prepn. method effect on)
- IT Hydrocarbons, preparation  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(C1-3, prepn. of, by **hydrogenation** of carbon monoxide,  
activity of supported nickel **catalysts** for)
- IT 7440-02-0, Nickel, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**, on alumina, for **hydrogenation** of carbon  
monoxide to hydrocarbons, activity of, method of prepn. effect on)
- IT 7440-44-0, Carbon, uses and miscellaneous  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(deposition of, on alumina-supported nickel **catalysts** for  
conversion of carbon monoxide to hydrocarbons, **catalyst**  
prepn. method effect on)
- IT 630-08-0, Carbon monoxide, reactions  
RL: RCT (Reactant)  
(**hydrogenation** of, in prodn. of hydrocarbons, supported  
nickel **catalysts** for, effect of **catalyst** prepn. on  
activity of)
- L26 ANSWER 36 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1987:73608 HCAPLUS  
DN 106:73608  
TI Characterization of carbon-supported **iron catalysts**  
prepared from **iron** pentacarbonyl  
AU Guerrero-Ruiz, A.; Lopez-Gonzalez, J. de D.; Mata-Arjona, A.;  
Romero-Sanches, V.; Rodriguez-Ramos, I.  
CS Dep. Inorg. Chem., Univ. Granada, Granada, Spain  
SO Adsorpt. Sci. Technol. (1987), 3(1), 33-40  
CODEN: ASTEEZ; ISSN: 0263-6174  
DT Journal  
LA English  
CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic** Reaction  
Mechanisms)
- AB **Fe catalysts** were prepd. by adsorption of **Fe**  
(CO)<sub>5</sub> on activated C. After redn. in H<sub>2</sub> flow at  
different temps., the metal dispersions and av. crystallite sizes were  
deterd. The **catalysts** were characterized by H<sub>2</sub> and  
CO chemisorption at 373 K, x-ray diffraction line broadening, and  
TEM. The **Fe** crystallites prepd. by this method present a narrow  
particle size distribution and have high metal dispersions. CO  
chemisorption at 373 K is a good technique to study **Fe** supported  
**catalysts**.
- ST **iron** carbon **catalyst** dispersion particle size; redn  
dispersion **iron** carbon **catalyst**; chemisorption carbon  
monoxide **hydrogen iron catalyst**
- IT **Catalysts** and Catalysis  
(**iron**-carbon, metal dispersion and particle-size distribution  
of, effect of redn. temp. on)
- IT Chemisorption  
(of **hydrogen** and carbon monoxide on **iron**-carbon  
**catalyst**, surface structure in relation to)

IT Surface structure  
(of **iron** supported on carbon, effect of redn. temp. on)  
IT Reduction  
(of **iron** supported on carbon, metal dispersion in particle size distribution in relation to temp. of)  
IT Particle size  
(of **iron**, supported on carbon, effect of redn. temp. on)  
IT 7440-44-0, Carbon, uses and miscellaneous  
RL: USES (Uses)  
(activated, **catalyst** from **iron** and, dispersion and particle size distribution of, effect of redn. temp. on)  
IT 7439-89-6, **Iron**, uses and miscellaneous  
RL: CAT (**Catalyst** use); USES (Uses)  
(**catalyst** from **activated** carbon and, **metal** dispersion and particle size distribution of, effect of redn. temp. on)  
IT 630-08-0, Carbon monoxide, reactions 1333-74-0, **Hydrogen**, reactions  
RL: RCT (Reactant)  
(chemisorption of, on **iron-carbon catalyst**, surface structure in relation to)

L26 ANSWER 37 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1986-035593 [05] WPIX

DNC C1986-015109

TI **Hydrogenation** of cpds. contg. alkenyl, alkynyl, aryl, cyano, imino - carbonyl or carboxyl gps. using **active** carbon **catalyst** comprising **dispersion** of transition **metal** in porous carbon matrix.

DC E19 E35 J04

IN WENNERBERG, A N

PA (STAD) STANDARD OIL CO INDIANA

CYC 1

PI US 4564702 A 19860114 (198605)\* 12p

ADT US 4564702 A US 1983-489407 19830428

PRAI US 1983-489407 19830428

IC C07C063-04

AB US 4564702 A UPAB: 19930922

**Hydrogenation** of an alkenyl, alkynyl, aryl, cyano, amino, carbonyl or carboxyl gp. in 1 or more organic cpds. comprises contact with **H2** at ambient temp. to 260 deg.C using an active C **catalyst** having a cage-like structure and a BET surface area of at least 800 sq.m. per g. and a bulk density of at least 0.1g per cc which comprises a substantially uniform dispersion of a transition metal, transition metal-contg. material, or both in a porous C matrix, wherein the total concn. of dispersed metal and dispersed metal-contg. material is 0.001-30wt.%, calculated as the elemental metal and based on the wt. of the **catalyst**.

The **catalyst** is pref. by: (a) forming a uniform **co**-crystallite of a precursor of the transition metal or transition-metal contg. material and of a C precursor; (b) forming a uniform powdered mixt. of the **co**-crystallite and inorganic solids comprising an alkali metal hydroxide; (c) pyrolysing the powdered mixt. in an inert atmos. at 400-980 deg.C to form the C(matrix) having the metal or metal material dispersed therein; and (d) sepg. unreacted inorganic material and inorganic reaction prods., other than the dispersed metal or metal-contg. material, from the C(matrix). Alternatively step (a) may be replaced by: (i) forming a C precursor contg. the metal or metal-contg. material by the chemical reaction in soln. of: (a) a soluble C precursor having at least 1 anionic gp. chemically bound thereto; and (b) a soluble cation or a



soluble cationic complex of a transition metal, and (ii) pptg. and drying the metal-contg. C precursor.

ADVANTAGE - Substantially improved selectivity and efficiency in the H-transfer reactions is achieved.

0/0

FS CPI

FA AB

MC CPI: E10-B04B; E10-E04; E10-J02A; E10-J02D; E31-N04; E34-C01; E35;  
J04-E01; N01-C02; N02; ~~N03; N04-A~~

L26 ANSWER 38 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1986-212450 [33] WPIX

DNC C1986-091452

TI Activation and modification of supported palladium catalyst - esp. for hydrogenation by simple and flexible calcination in gas contg. oxygen.

DC J04

IN DEHNER, R; GLOMBIK, A; HEILMANN, A; KOTTER, J; LIESKE, H; QUECK, S;  
SCHUBERT, R; VOLTER, J; GRASSHOFF, E; HATTWIG, M; KECK, M; KOETTER, J;  
LANGE, J; LUNAU, J; MEYE, H; SCHOEDEL, R; STUERTZ, H; VOELTER, J

PA (VELW) VEB LEUNA-WERKE ULBRICHT W; (VELW) LEUNA-WERKE GMBH

CYC 1

PI DD 234798 A 19860416 (198633)\* 12p

DD 234798 B5 19950727 (199540) B01J023-44

ADT DD 234798 A DD 1985-273400 19850220; DD 234798 B5 DD 1985-273400 19850220

PRAI DD 1985-273400 19850220

IC B01J023-44; B01J037-48

ICM B01J023-44

ICS B01J037-08; B01J037-14; B01J037-48

AB DD 234798 A UPAB: 19930922

Activation and modification of supported Pd catalysts.

opt. contg. other components, by calcination is carried out by heating for up to 48 h at 400-1373 K in a gas contg. 0.1-100 vol% O2 at a pressure of at least 0.1 MPa, followed by redn. if necessary.

The amt. of gas w.r.t. the vol. of catalyst is up to 2500, pref. up to 1000 v/vh; the duration of treatment max. 24 hr., esp. 0.5-12 hr; and the treatment temp. over 1150 K at an O2 partial pressure of at least 0.1 MPa and a stationary gas atmos.; 600-1200 K in a gas stream contg. under 15 vol% O2; 750-1150 K in a gas atmos. contg. less than 5 vol% O2 in conjunction with N2, other inert gases, H2, gas mixts. contg. H2 and combustion gases contg. impurities and with a low O2 content; 873-1173 K in an atmos. contg. at least 15, esp. 10-100 vol% O2; and 1023-1150 K in air, air-O2 mixts. or pure O2.

USE/ADVANTAGE - The catalyst is useful for selective hydrogenation. The process has high capacity, is flexible and simple and allows the hydrogenation activity and metal dispersity to be increased or reduced as required.

0/0

FS CPI

FA AB

MC CPI: J04-E04B; N02-F02

L26 ANSWER 39 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1986:224589 HCAPLUS

DN 104:224589

TI Colloidal palladium supported on chelate resin containing iminodiacetic acid groups as hydrogenation catalyst

AU Hirai, Hidefumi; Komatsuzaki, Shigeru; Toshima, Naoki

CS Fac. Eng., Univ. Tokyo, Tokyo, 113, Japan

SO J. Macromol. Sci., Chem. (1986), A23(8), 933-54

CODEN: JMCHBD; ISSN: 0022-233X

DT Journal

LA English

CC 24-4 (Alicyclic Compounds)

Section cross-reference(s): 67

AB Colloidal Pd supported on a chelate resin contg. iminodiacetic acid groups was prepd. by refluxing the Pd chelate resin in methanol-water. Using the resin-supported colloidal Pd as a **catalyst**, cyclopentadiene was **hydrogenated** to cyclopentene in 97.1% selectivity at 100% conversion of cyclopentadiene under 1 atm of **hydrogen** in methanol at 30.degree.C. Finely dispersed metal particles ranging from 10 to 60 .ANG. in diam. were obsd. in the resin by electron microscopy. Both x-ray microanal. for Pd and elution anal. of Pd ion with an aq. soln. of disodium salt of EDTA demonstrated the existence of large amts. of Pd ion complexes in the resin. The amt. of Pd metal in the resin was estd. to be .apprx.5% of the total Pd. Since the resin, after removal of most of the ionic Pd, exhibited almost the same catalytic activity as before, it was concluded that the finely **dispersed metal particles** are the **active species** in the **catalyst**.

ST colloid **palladium** chelate resin **catalyst**  
**hydrogenation**; polymer iminodiacetate **palladium catalyst**

IT **Hydrogenation catalysts**

(**palladium** colloidal supported on chelating resin contg. iminodiacetic acid groups, for cyclopentadiene)

IT 7440-05-3, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)

(**catalyst**, colloidal, on chelate resin contg. iminodiacetic acid groups, for **hydrogenation**)

IT 142-73-4

RL: PRP (Properties)

(chelate resin contg. groups of, **palladium** colloidal **catalyst** support from)

IT 542-92-7, reactions

RL: RCT (Reactant)

(**hydrogenation** of, **palladium** supported on chelated resin as **catalysts** for)

L26 ANSWER 40 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1986:231309 HCAPLUS

DN 104:231309

TI Platinum **catalysts** supported on activated carbons. I.  
Preparation and characterization

AU Rodriguez-Reinoso, F.; Rodriguez-Ramos, I.; Moreno-Castilla, C.;  
Guerrero-Ruiz, A.; Lopez-Gonzalez, J. D.

CS Dep. Quim. Inorg., Univ. Alicante, Alicante, Spain

SO J. Catal. (1986), 99(1), 171-83

CODEN: JCTLA5; ISSN: 0021-9517

DT Journal

LA English

CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic** Reaction  
Mechanisms)

AB Several Pt **catalysts** supported on activated carbons (manufd. from olive stones and almond shells) were prepd. with both H<sub>2</sub>PtCl<sub>6</sub>.6H<sub>2</sub>O and [Pt(NH<sub>3</sub>)<sub>4</sub>]Cl<sub>2</sub> as metal precursor and by using different methods. Once reduced, the supported **catalysts** were characterized by H and CO chemisorption as well as x-ray diffraction and TEM. The effect of redn. conditions on metal dispersion was studied and correlated with

the surface properties of the supports. Pore sizes of 9-11 nm are necessary for obtaining a high Pt dispersion. To increase the dispersion of the **catalysts** prepd. from  $[Pt(NH_3)_4]Cl_2$ , a treatment with He prior to redn. of the **catalysts** in H is essential to avoid the formation of an unstable hydride which leads to agglomeration of the Pt particles.

- ST platinum **catalyst** activated carbon prepn; pore size platinum dispersion carbon
- IT Chemisorption  
(of hydrogen and carbon monoxide, on platinum-carbon **catalyst**, surface structure in relation to)
- IT Particle size  
(of platinum, on activated carbon, effect of prepn. method on)
- IT Reduction **catalysts**  
(of platinum-carbon, metal dispersion in relation to)
- IT 7440-44-0P, uses and miscellaneous  
RL: PREP (Preparation)  
(activated, **catalysts** from platinum and, metal dispersion in relation to prepn. of)
- IT 7440-06-4, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from activated carbon and, metal dispersion in relation to prepn. method of)
- IT 630-08-0, reactions 1333-74-0, reactions  
RL: RCT (Reactant)  
(chemisorption of, on platinum-carbon **catalysts**, particle size and porosity in relation to)

L26 ANSWER 41 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1985-190420 [32] WPIX

DNN N1985-142823 DNC C1985-083161

TI Testing granular supported **metal catalyst** for activity and dispersity - by combined reaction in U-shaped reactor and pulsed carbon mon oxide chemisorption.

DC J04 S03

IN KECK, M; LAMBRECHT, W; MEYE, H; NEUBAUER, H D; NEUMANN, U; SCHODEL, R; SCHUBERT, R

PA (VELW) VEB LEUNA-WERKE ULBRICHT W

CYC 1

PI DD 220826 A 19850410 (198532)\* 5p

DD 220826 B 19880525 (198841)

ADT DD 220826 A DD 1984-259769 19840201

PRAI DD 1984-259769 19840201

IC B01J037-00; G01N007-00; G01N031-10

AB DD 220826 A UPAB: 19930925

Combined determ. of the activity and dispersity of granular supported **metal catalysts** (I) in the 273-873 K temp. range at normal pressure up to pressures of 50 MPa is carried out with a U-shaped flow reactor and selective gas chemisorption by the pulsed flow method. 100-2000 mg (I) are heated to the redn. in the activation gas at a given pressure in a reactor in a radiant furnace. After activation, (I) is cooled to the reaction temp. and charged with the reaction gas. After at least 30 min, the reactivity is tested, then (I) is purged with at least 20 000 v/vh H<sub>2</sub> for 10-180, pref. 30 min in the same reactor and hence brought to a temp. at least 10 K higher than the reaction temp. but max. to the activation temp. After this, it is shock cooled to 273 K and the flow is adjusted to 4-6 l/h. Then 0.2-0.4 cc CO pulses are passed over (I) at normal pressure at 4-6 min intervals until the metal surface is satd. Throughout the process, the gas flows first through the (I) charge and only then through the frit of the reactor.

USE/ADVANTAGE - The method is reliable, saves time, energy and material and is useful for quality control.

1/1

FS CPI EPI

FA AB

MC CPI: J04-C03; J04-E01; N06-D

EPI: S03-E12

L26 ANSWER 42 OF 52 HCAPLUS COPYRIGHT 2002 ACS

AN 1986:156548 HCAPLUS

DN 104:156548

TI Comparative study of nickel **catalysts** supported on X- and Y-zeolites

AU Chien, Shu Hua; Lu, Kuang Lieh; Huang, Hsiau Wen

CS Inst. Chem., Acad. Sin., Taipei, 115, Taiwan

SO J. Chin. Chem. Soc. (Taipei) (1985), 32(3), 309-15

CODEN: JCCTAC; ISSN: 0009-4536

DT Journal

LA English

CC 67-2 (Catalysis, Reaction Kinetics, and **Inorganic** Reaction Mechanisms)

Section cross-reference(s): 51

AB A comparative study of **CO/H<sub>2</sub>** reactions over Ni **catalysts** supported on X- and Y-zeolites, prepd. by incipient-wetness impregnation (W) and ion-exchange (E) methods was done. The **catalysts** were characterized by surface area and volumetric chemisorption measurements, temp.-programmed redn. profiles, and x-ray diffraction anal. The turnover frequency decreases in the order: NiX(W) > NiY(W) > NiY(E) > NiX(E). The **metal dispersion** and **activity** of the **catalyst** are affected mainly by the support materials, the prepn. methods, and the activation procedures. The high activity of NiX(W) is due to its higher reducibility, smaller Ni cryst. size, and better Ni dispersion. The low activity of NiX(E) is attributed to the poor ion-exchange of Ni with NaX, the poor reducibility, the large cryst. size, and the poor Ni dispersion.

ST nickel zeolite **catalyst** **hydrogenation** carbon monoxide; surface structure nickel zeolite **catalyst**; reducibility nickel zeolite **catalyst** activity; dispersion nickel zeolite **catalyst** activity

IT **Hydrogenation catalysts**

(nickel-zeolites, for carbon monoxide, activity of, effect of prepn. method on)

IT Chemisorption

(of **hydrogen**, on nickel-zeolite **catalysts**, activity in relation to)

IT Surface structure

(of nickel-zeolite **catalysts**, activity in relation to)

IT Zeolites, uses and miscellaneous

RL: CAT (**Catalyst use**); USES (Uses)

(X, **catalysts** from nickel and, for **hydrogenation** of carbon monoxide, effect of prepn. method on activity of)

IT Zeolites, uses and miscellaneous

RL: CAT (**Catalyst use**); USES (Uses)

(Y, **catalysts** from nickel and, for **hydrogenation** of carbon monoxide, effect of prepn. method on activity of)

IT 7440-02-0, uses and miscellaneous

RL: CAT (**Catalyst use**); USES (Uses)

(**catalysts** from zeolites and, for **hydrogenation** of carbon monoxide, effect of support material and prepn. method on activity of)

- IT 1333-74-0, reactions  
RL: RCT (Reactant)  
(chemisorption of, on nickel-zeolite **catalysts**, activity in relation to)
- IT 630-08-0, reactions  
RL: RCT (Reactant)  
(**hydrogenation** of, on nickel-zeolite **catalysts**)
- L26 ANSWER 43 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1986:24797 HCAPLUS  
DN 104:24797  
TI Solvated **metal atom dispersed (SMAD) catalysts**  
. Highly **active bimetallic systems**  
AU Imizu, Yuzo; Klabunde, Kenneth J.  
CS Dep. Chem., Kansas State Univ., Manhattan, KS, 66506, USA  
SO Chem. Ind. (Dekker) (1985), 22(Catal. Org. React.), 225-50  
CODEN: CHEIDI; ISSN: 0737-8025  
DT Journal  
LA English  
CC 67-1 (Catalysis, Reaction Kinetics, and **Inorganic Reaction Mechanisms**)  
Section cross-reference(s): 22
- AB New bimetallic catalytic materials were prepd. by the solvated metal atom dispersion (SMAD) procedure. A series of 0 valent bimetallic composites **Co-Cr/SiO2**, **Co-Mn/SiO2**, and **Co-Fe/SiO2** were prepd. and studied in catalytic test reactions and by **H2 chemisorption**. An increase in activity for the **Co/SiO2 catalyst** was found when Mn was inserted into the **Co particles**; the increase being sufficient to create a **catalyst** active enough to **hydrogenate** 1-butene at -60.degree. in a diffusion-controlled process. Selectivity/activity studies coupled with **H2 chemisorption** results show that 1/2 of the **Co atoms** are surface atoms, and that the **Co clusters** are probably affected by the Mn in an electronic fashion.
- ST **hydrogenation catalyst cobalt silica**;  
**bimetallic cobalt silica catalyst**; dispersed  
**catalyst solvated metal prepn**; manganese **cobalt silica catalyst prepn**; iron **cobalt silica catalyst prepn**
- IT **Catalysts and Catalysis**  
**Hydrogenation catalysts**  
**Hydrogenolysis catalysts**  
**Isomerization catalysts**  
(**cobalt bimetallic**, on silica support, solvated metal atom disperse method in prepn. of)
- IT 7439-89-6P, uses and miscellaneous 7439-96-5P, uses and miscellaneous  
RL: **CAT (Catalyst use)**; **PREP (Preparation)**; **USES (Uses)**  
(**catalyst**, with **cobalt** on silica support, solvated metal atom dispersion method in prepn. of)
- IT 7440-48-4, uses and miscellaneous  
RL: **CAT (Catalyst use)**; **USES (Uses)**  
(**catalysts**, prepn. of bimetallic, solvated metal atom dispersion method in)
- L26 ANSWER 44 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1985:529759 HCAPLUS  
DN 103:129759  
TI Effect of alkali metal ions on the catalytic activity of **palladium/silica-aluminum phosphate systems**

- AU Aramendia, M. A.; Borau, V.; Jimenez, C.; Marinas, J. M.; Sempere, M. E.  
CS Fac. Cienc., Univ. Cordoba, Cordoba, Spain  
SO React. Kinet. Catal. Lett. (1985), 27(1), 133-8  
CODEN: RKCLAU; ISSN: 0304-4122  
DT Journal  
LA English  
CC 67-2 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
AB The effects of different alkali metal hydroxides on the **metallic dispersity** and **catalytic activity** of SiO<sub>2</sub>-AlPO<sub>4</sub> supported **Pd catalysts** were studied. The redn. by H transfer to benzylideneacetone and styrene (from cyclohexene and n-octanol, resp., as H donors) and the liq.-phase redn. of cyclohexene were used as test reactions to measure the catalytic activity.  
ST **palladium catalyst** alkali metal hydroxide; **dispersity palladium oxide catalyst**; **redn catalyst**  
**palladium** alkali metal; benzylidene acetone **redn palladium catalyst**; styrene **redn octanol palladium catalyst**; **hydrogen transfer catalyst**  
**palladium**  
IT **Hydrogen transfer catalysts**  
**Reduction catalysts**  
(**palladium-aluminum phosphate-silica**, effect of alkali metal ions on activity of)  
IT Alkalies  
RL: USES (Uses)  
(promoters, for **palladium-aluminum phosphate-silica catalysts**)  
IT 7440-05-3, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from aluminum phosphate, silica and, effect of alkali metal ions on **dispersity** and **activity** of)  
IT 7784-30-7  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from **palladium**, silica and, for redn., effect of alkali metal hydroxides on)  
IT 111-87-5, uses and miscellaneous  
RL: USES (Uses)  
(**hydrogen transfer** from, to styrene, **palladium catalysts** for)  
IT 122-57-6  
RL: RCT (Reactant)  
(**hydrogen-transfer redn.** of, by cyclohexene, **palladium catalysts** for)  
IT 100-42-5, reactions  
RL: RCT (Reactant)  
(**hydrogen-transfer redn.** of, by octanol, **palladium catalysts** for)  
IT 110-83-8, reactions  
RL: RCT (Reactant)  
(redn. of, **palladium catalysts** for)  
L26 ANSWER 45 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD  
AN 1984-133903 [21] WPIX  
DNC C1984-056616  
TI Dehydrogenating paraffin(s) and naphthene(s) - and dehydro cyclising paraffin(s) using **catalyst** of **active carbon** contg. uniform **dispersion** of transition metal (oxide).  
DC E19 H04

IN WENNERBERG, A N  
PA (STAD) STANDARD OIL CO INDIANA  
CYC 1  
PI US 4447665 A 19840508 (198421)\* 11p  
ADT US 4447665 A US 1983-480407 19830330  
PRAI US 1983-480407 19830330  
IC B01J021-18; C07C005-32  
AB US 4447665 A UPAB: 19930925

Dehydrogenation of paraffinic and naphthenic cpds. and dehydrocyclisation of paraffins having a straight chain of at least 5 C atoms is carried out at 465-650 (pref. 450-535) deg.C. 2-30 (10-20) atm. and a total WHSV of 0.2-30 (2-10), opt. in the presence of 2-30 (5-15) moles/mole feed of H<sub>2</sub>, using a **catalyst** (I) comprising active C having a cage-like structure, a BET surface area of at least 800 (1600, esp. at least 2000) sq.m/g. and a bulk density of at least 0.1 (0.2) g/sq.cm.

More specifically, (I) contains 0.01-30 wt.% metal and/or metal oxide uniformly dispersed in the porous C matrix, the metal being a transition metal selected from Pt, Pd, Rh, Mo, Cr, W, Fe, Co, Ni and Cu, and the **catalyst** is formed by pyrolysing a uniform powdered mixt. of a precursor (II) of the metal (oxide), a C precursor (III) and inorganic solids (comprising an alkali metal hydroxide) at 400-950 deg.C. in an inert atmosphere.

(I) exhibits high selectivities and minimised deactivation.

O/O

FS CPI

FA AB

MC CPI: E10-C04A; E10-C04H; E35-P; E35-Q; E35-U; E35-V; E35-W; E35-X;  
H04-E03; H04-F02E; J04-F02E; N02; N03-C; N03-D

L26 ANSWER 46 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD  
AN 1984-090872 [15] WPIX  
DNC C1984-038504

TI Prepn. of zeolite type catalysts contg. highly dispersed metals  
- by hydrothermal crystallisation and treatment with hydrogen.

DC E19 H04 J04

IN MATHE, T; PETRO, J; TUNGLER, A

PA (MAGY) MAGYAR TUDOMANYOS AKAD

CYC 1

PI HU 29904 T 19840228 (198415)\*

ADT HU 29904 T HU 1981-1699 19810608

PRAI HU 1981-1699 19810608

IC B01J023-00; B01J029-04

AB HU 29904 T UPAB: 19930925

Prepn. of zeolite-type catalysts contg. highly dispersed  
, catalytically active metals is claimed. The process

involves (a) mixing a soln. or dispersion of (i) a cpd. of the formula (R<sub>1</sub>(R<sub>3</sub>)N(R<sub>2</sub>)R<sub>4</sub>)(+)X(-), where R<sub>1</sub>-4 are ethyl, propyl, butyl, benzyl or hydroxethyl; and X is OH or an inorganic acid residue), (ii) silica, (iii) an aq. soln. contg. Pd, Pt, Ru, Rh, Ag, Cu, Cd, Ni, Fe and/or Re cpds., and opt. (iv) aluminium hydroxide or sodium aluminate; (b) hydrothermally crystallising at 100-200 deg. C for 24-150 hrs; (c) cooling; (d) sepg. the solid prod., and (e) treating the prod. with H<sub>2</sub> at 25-450 deg. C.

FS CPI

FA AB

MC CPI: E05-T; E31-P02; H04-F02; J04-E04; N06-B; N06-E

L26 ANSWER 47 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1985:45434 HCAPLUS  
DN 102:45434

- TI Effect of **metal dispersion** on the **activity**  
and selectivity of a rhodium/silicon dioxide **catalyst** for high  
pressure carbon monoxide **hydrogenation**
- AU Arakawa, Hironori; Takeuchi, Kazuhiko; Matsuzaki, Takehiko; Sugi,  
Yoshihiro
- CS Natl. Chem. Lab. Ind., Yatabe, 305, Japan
- SO Chem. Lett. (1984), (9), 1607-10  
CODEN: CMLTAG; ISSN: 0366-7022
- DT Journal
- LA English
- CC 23-1 (Aliphatic Compounds)
- AB Metal dispersion has a striking influence on the activity and selectivity  
of Rh/SiO<sub>2</sub> for high pressure **CO hydrogenation**. With  
decreasing dispersion, turnover frequency of **CO** conversion does  
not change significantly with dispersion up to 0.5, but increases abruptly  
at a dispersion of 0.45. MeOH is produced selectively at high dispersion.  
C<sub>2</sub>-oxygenated compds. are favored for dispersions of 0.25-0.45. CH<sub>4</sub>  
formation increases monotonously with a decrease of dispersion.
- ST rhodium **hydrogenation catalyst**; carbon monoxide  
**hydrogenation catalyst**; metal dispersion  
**hydrogenation catalyst**
- IT **Hydrogenation catalysts**  
(rhodium, for carbon monoxide, effect of metal dispersion on)
- IT **Catalysts and Catalysis**  
(rhodium, for reaction of carbon monoxide with **hydrogen**,  
effect of metal dispersion on)
- IT 7440-16-6, uses and miscellaneous  
RL: CAT (**Catalyst use**); USES (**Uses**)  
(**catalyst**, for high pressure carbon monoxide  
**hydrogenation**, effect of metal dispersion on)
- IT 630-08-0, reactions  
RL: RCT (**Reactant**)  
(high pressure **hydrogenation** of, over rhodium  
**catalyst**, effect of metal dispersion on)
- IT 64-17-5P, preparation 64-19-7P, preparation 67-56-1P, preparation  
74-82-8P, preparation 75-07-0P, preparation  
RL: SPN (**Synthetic preparation**); PREP (**Preparation**)  
(prepn. of, by **hydrogenation** of carbon monoxide over rhodium,  
effect of metal dispersion on)
- L26 ANSWER 48 OF 52 HCAPLUS COPYRIGHT 2002 ACS
- AN 1983:34062 HCAPLUS
- DN 98:34062
- TI Preparation of **palladium**/aluminum phosphate, **palladium**  
/aluminum phosphate-silica, and **palladium**/aluminum  
phosphate- $\gamma$ -alumina and study of their catalytic activity for the  
reduction of nitrobenzene by **hydrogen** transfer
- AU Aramendia, M. A.; Borau, V.; Jimenez, C.; Marinas, J. M.; Pajares, J. A.
- CS Dep. Quim. Org., Univ. Cordoba, Cordoba, Spain
- SO J. Catal. (1982), 78(1), 188-96  
CODEN: JCTLA5; ISSN: 0021-9517
- DT Journal
- LA English
- CC 22-7 (Physical Organic Chemistry)  
Section cross-reference(s): 67
- AB The prepn. and catalytic activity for the H-transfer redn. of PhNO<sub>2</sub> of new  
metallic systems obtained by supporting Pd on AlPO<sub>4</sub>, AlPO<sub>4</sub>-SiO<sub>2</sub>  
and AlPO<sub>4</sub>- $\gamma$ -Al<sub>2</sub>O<sub>3</sub> are reported. Metal dispersion decreases in the  
order Pd/AlPO<sub>4</sub>-SiO<sub>2</sub> > Pd/AlPO<sub>4</sub> > Pd  
/AlPO<sub>4</sub>- $\gamma$ -Al<sub>2</sub>O<sub>3</sub>, and, according to the method of prepn., cationic



exchange > impregnation > anionic exchange. **Catalysts** prepd. by cationic exchange on AlPO<sub>4</sub>-SiO<sub>2</sub> show high dispersion values. The **catalysts** have different activities for PhNO<sub>2</sub> redn. to PhNH<sub>2</sub> in refluxing PhNO<sub>2</sub>-cyclohexene (383 K), with a selectivity near 100% and without poisoning. No influence of the acidity of the different metal systems was found, the activity depending only on the **dispersion** of the **active metal** phase.

- ST **palladium** aluminum phosphate redn **catalyst**;  
nitrobenzene **hydrogen** transfer **catalyst**; aniline prepn  
**catalyst**
- IT **Hydrogen** transfer  
(from cyclohexene to nitrobenzene, effect of **palladium**  
**catalysts** on)
- IT Reduction  
(of nitrobenzene over **palladium**-aluminum phosphate, mechanism  
of)
- IT Reduction **catalysts**  
(**palladium**-aluminum phosphate, for nitrobenzene, effects of  
support and method of prepn. on)
- IT 7440-05-3, uses and miscellaneous  
RL: PRP (Properties)  
(**catalysts** with aluminum phosphate, for nitrobenzene redn.,  
effect of support and prepn. method on)
- IT 7784-30-7  
RL: CAT (**Catalyst** use); USES (Uses)  
(**catalysts**, with **palladium**, for nitrobenzene redn.,  
effect of support and method of prepn. on)
- IT 110-83-8, reactions  
RL: RCT (Reactant)  
(**hydrogen** transfer from, to nitrobenzene, mechanism of  
catalytic)
- IT 98-95-3, reactions  
RL: RCT (Reactant)  
(redn. of, by **hydrogen** transfer from cyclohexene, effect of  
**palladium**-aluminum phosphate **catalysts** on)
- L26 ANSWER 49 OF 52 HCAPLUS COPYRIGHT 2002 ACS  
AN 1978:169330 HCAPLUS  
DN 88:169330  
TI Hydrogenolysis of cyclopentane and **hydrogenation** of benzene on  
**palladium** **catalysts** of widely varying dispersion  
AU Fuentes, Sergio; Figueras, Francois  
CS Inst. Rech. Catal., CNRS, Villeurbanne, Fr.  
SO J. Chem. Soc., Faraday Trans. 1 (1978), 74(1), 174-81  
CODEN: JCFTAR; ISSN: 0300-9599  
DT Journal  
LA English  
CC 22-5 (Physical Organic Chemistry)  
AB Adsorption of H and O, titrn. of preadsorbed O, C<sub>6</sub>H<sub>6</sub> **hydrogenation**  
, and cyclopentane hydrogenolysis were studied on **Pd**  
**catalysts** of widely varying dispersion. The stoichiometry of O  
adsorption changes with increasing metallic dispersion. On clean supports  
free of S and Fe, the turnover no. for both hydrocarbon  
reactions is const. and independent of the **Pd** dispersion. After  
a suitable redn., S may preferentially inhibit hydrogenolysis, whereas  
Fe preferentially inhibits **hydrogenation**. On an  
industrial SiO<sub>2</sub> support, the turnover for hydrogenolysis changes with  
dispersion; this was attributed to contamination of **Pd** by  
Fe from the support.
- ST **palladium** **catalyst** **hydrogenation** benzene;

hydrogenolysis cyclopentane **catalyst palladium**;  
adsorption **hydrogen oxygen palladium**; iron  
poison **palladium catalyst**; sulfur poison  
**palladium catalyst**

IT Adsorption

(of **hydrogen** and oxygen, on **palladium**, metallic  
dispersion in relation to)

IT **Hydrogenation catalysts**

(**palladium** dispersions, for benzene)

IT Hydrogenolysis **catalysts**

(**palladium** dispersions, for cyclopentane)

IT 1333-74-0, properties 7782-44-7, properties

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(adsorption of, by **palladium**, effect of metallic dispersion  
on)

IT 7440-05-3, uses and miscellaneous

RL: CAT (**Catalyst use**); USES (Uses)

(**catalysts**, for benzene **hydrogenation** and  
cyclopentane hydrogenolysis, effect of **metallic**  
**dispersion on activity** of)

IT 71-43-2, reactions

RL: RCT (Reactant)

(**hydrogenation** of, catalyzed by **palladium**, effect  
of metallic dispersion on)

IT 287-92-3

RL: RCT (Reactant)

(hydrogenolysis of, catalyzed by **palladium**, effect of  
metallic dispersion on)

IT 7439-89-6, uses and miscellaneous

RL: USES (Uses)

(poison, for **palladium catalysts** for  
**hydrogenation** and hydrogenolysis)

IT 7704-34-9, uses and miscellaneous

RL: USES (Uses)

(poison, for **palladium catalysts** for hydrogenolysis  
of cyclopentane)

L26 ANSWER 50 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1977-11027Y [06] WPIX

TI Methanation of **hydrogen** and carbon oxide mixts. - using a molten  
**catalyst** resistant to sulphur contg. **active**  
**metal catalyst** dispersed in zinc or cadmium  
halide.

DC E36 H09

PA (SHEL) SHELL OIL CO

CYC 1

PI US 4006177 A 19770201 (197706)\*

PRAI US 1975-619543 19751003

IC C07C027-06

AB US 4006177 A UPAB: 19930901

Continuous prodn. of CH<sub>4</sub> from a S-contg. gas mixt. contg. H<sub>2</sub>,  
CO and/or CO<sub>2</sub> comprises reacting the mixt. at >500 degrees C with  
a molten **catalyst** system consisting of >=1 Zn or Cd halide as  
carrier of m.pt. <1000 degrees C in which is dispersed >=1 active  
**catalyst** i.e. finely-divided Fe, Mo, Mn, Ni, Co  
, Zn, Ti, Ag, Cu and Th or their oxides and/or carbides. The gaseous  
prod. is recovered while some of the carrier is converted to sulphide.

At least a part of the melt is separated (the rest is recycled) and  
treated with **hydrogen** halide at 50-400 degrees C to convert the  
sulphide back to halide. The regenerated melt is then recycled.

Method is for mfr. of fuel gas esp. in conjunction with steam gasification of coal. The **catalyst** is resistant to S so prior desulphurisation is not necessary; less susceptible to C deposition than solid **catalysts**; and absorbs H<sub>2</sub>O so shifts the equilibrium towards CH<sub>4</sub> formation.

FS CPI

FA AB

MC CPI: E10-J02D; H09-C; H09-D; N02; N03; N04-A

L26 ANSWER 51 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1976-59863X [32] WPIX

TI Reactivation of platinum and **palladium catalysts** -  
obtd by treatment with chlorine-air mixts contg **hydrogen**  
chloride.

DC H04 J04

PA (KOGI-I) KOGLER H

CYC 1

PI DD 120589 A 19760620 (197632)\*

PRAI DD 1968-189217 19681018

IC B01J011-16; B01J023-96

AB DD 120589 A UPAB: 19930901

Activation or re-activation of catalysts contg. Pt or Pd on an alumina or Al silicate carrier is carried out by  
treatment with a chlorine/air mixt. contg. dry HCl gas in ratio HCl/Cl<sub>2</sub> of 1:3-6, at 300-350 degrees C for 30-70 mins. Used for **catalysts** used in reforming, isomerising or hydrocracking processes esp. after use and de-activation by **catalyst** poisons e.g. heavy **metals**.  
. **Dispersion** of the **active metal** is improved by formation of soluble complexes e.g. H<sub>2</sub>PtCl<sub>6</sub>. Heavy metals e.g Pb and As are removed as chlorides in the gas phase. Chloride content after activation is kept within permissible limit of 1% max. Halogenation of the carrier, with loss of activity, as occurs at usual activation temp. of over 450 degrees C, is prevented.

FS CPI

FA AB

MC CPI: H04-F; J04-A02

L26 ANSWER 52 OF 52 WPIX COPYRIGHT 2002 DERWENT INFORMATION LTD

AN 1970-12738R [08] WPIX

TI Low sodium content zeolite based hydroforming - **catalysts**.

DC H04 J04

PA (SHEL) SHELL INT RES MIJ NV

CYC 6

PI BE 737585 A (197008)\*

DE 1941947 A (197009)

NL 6912516 A (197009)

FR 2015902 A (197035)

CA 914138 A (197247)

JP 48022590 B (197328)

DE 1941947 B 19771208 (197750)

NL 161994 B 19791115 (197948)

PRAI GB 1968-39512 19680819

IC B01J029-36; B01J037-02; C10G013-02

AB BE 737585 A UPAB: 19930831

**Catalyst** for hydroforming petroleum hydrocarbons is based on a zeolite having an SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> ratio between 3 and 7 and an alkali metal content reduced to <2, preferably 0.5-0.04% wt. (as NaO). The zeolite is treated with ammonium separately or simultaneously with deposition of a solution of W and/or Mo and a metal from the **iron** group (VIII) under conditions of pH >6.8, preferably 10-13. Preferably the Na content

of the natural or synthetic zeolite is reduced by precalcination at 250-450 degrees C followed by treatment with boiling 2M  $\text{NH}_4\text{NO}_3$  solution and calcination at 500-825, preferably 500-700 degrees C. Preferably tungstic acid, ammonium molybdate and a Ni or Co salt are deposited on the zeolite from a basic organic solvent (an alkylamine, alkanolamine, hydrazine or hydroxylamine) and the zeolite is subsequently recalcined at 400-650 degrees C.

Used especially for single stage hydroforming of petroleum hydrocarbons boiling point 350 degrees C by treatment at 250-450 degrees C with 30-200 kg/cm<sup>2</sup> partial pressure of  $\text{H}_2$  at throughputs of 0.2-10 litres hydrocarbon per litre catalyst per hour and 250-5000 litres  $\text{H}_2$  per kg hydrocarbon. Also suitable for hydrocracking hydrocarbon liquids including gas oils and asphalt residues. The reduced Na content and good dispersion of the active metals (W, Mo) present results in high catalyst activity, allowing higher than usual feedstock throughputs or use of lower temperatures. The catalysts remain active in the presence of nitrogenous bases and will tolerate some polyaromatic materials in the feedstock, and are easily regenerated by combustion and recalcination if necessary.

FS CPI

FA AB

MC CPI: H04-B03; H04-C03